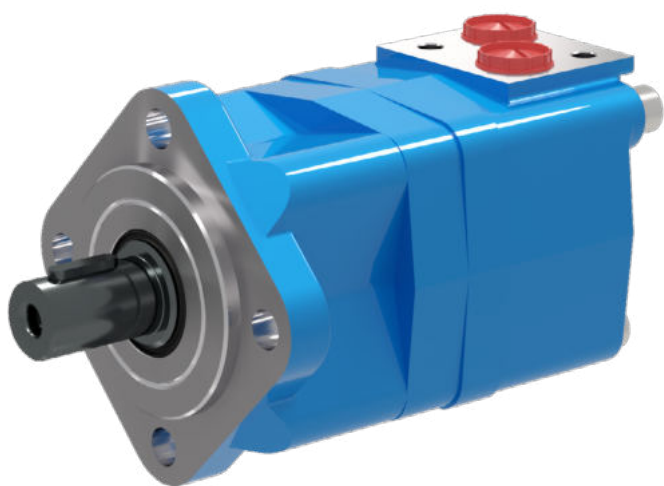


**BREVINI<sup>®</sup>***Motion Systems*

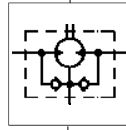
## HR Orbital Motors



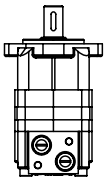
|                                      |            |
|--------------------------------------|------------|
| Motor Features                       | <b>F2</b>  |
| Motor Technical Specifications       | <b>F3</b>  |
| Performance Curves                   | <b>F4</b>  |
| Pressure Data                        | <b>F8</b>  |
| Max. Permissible Shaft Seal Pressure | <b>F8</b>  |
| Pressure Loss                        | <b>F8</b>  |
| Other Informations                   | <b>F9</b>  |
| Ordering Code                        | <b>F10</b> |
| Dimensions and Weight                | <b>F14</b> |
| Brake feature F/L version            | <b>F18</b> |
| Dimensions and Weight                | <b>F20</b> |
| Shaft End                            | <b>F24</b> |
| Main Ports                           | <b>F26</b> |
| Special version                      | <b>F28</b> |
| Options                              | <b>F29</b> |



## HR

**S**

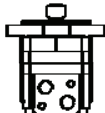
Standard Version

**W**

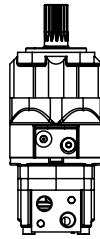
Wheel Version

**C**

Bearingless Version

**F**

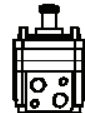
Brake Version

**L**

Wheel Version with brake

**M**

Short Version for Gear Box



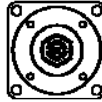
A4



A2



C4



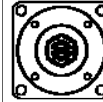
B4



A4



C4



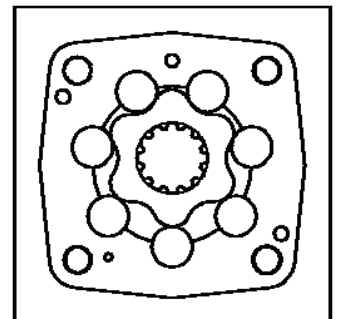
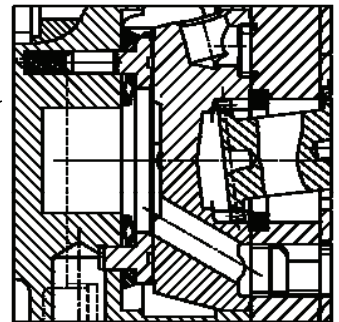
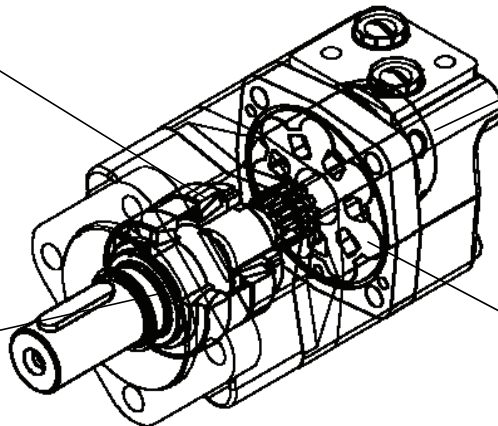
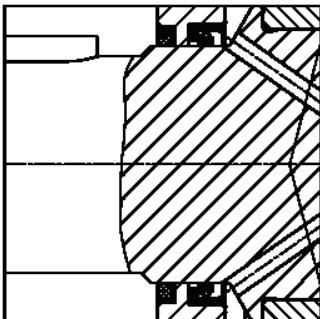
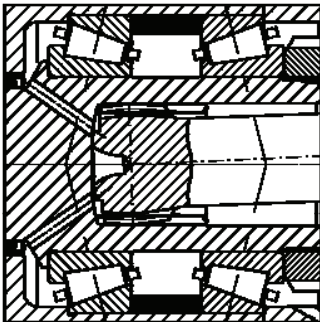
M4



Shaft supported by two heavy duty tapered roller bearings that ensure outstanding radial load capacity Max 40000 N [Max. 9000 lbf].

Disc valve distribution with automatic compensation of backlash done by fluid under pressure: lower drain figures are then guaranteed together with high efficiency. The motor is supplied with internally built-in check valves.

HR



Dust Seal for high pressure of the output shaft. The motor can work with casing pressure up to 160 bar [2320 psi].

Heavy duty, roller type stator meant to work at high pressure and to guarantee extra long lasting.

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DC5B1A1\_000000R2 - 03/2024



| Motor  | Displacement<br>cm <sup>3</sup> /rev [in <sup>3</sup> /rev] | Max. input pressure<br>bar [psi]          |                                        | Max. differential pressure<br>bar [psi]   |                                        | Max. torque<br>Nm [lbf·ft] |                        | Max. flow<br>l/min [U.S. gpm] |                        | Max. speed<br>rpm      |            | Max. power<br>kW [hp]  |                            |
|--------|-------------------------------------------------------------|-------------------------------------------|----------------------------------------|-------------------------------------------|----------------------------------------|----------------------------|------------------------|-------------------------------|------------------------|------------------------|------------|------------------------|----------------------------|
| HR 080 | 80.4 [4.9]                                                  | Cont Int <sup>1)</sup> Peak <sup>2)</sup> | 210 [3045]<br>310 [4495]<br>310 [4495] | Cont Int <sup>1)</sup> Peak <sup>2)</sup> | 205 [2972]<br>310 [4495]<br>310 [4495] | Cont Int <sup>1)</sup>     | 235 [173]<br>345 [254] | Cont Int <sup>1)</sup>        | 75 [19.8]<br>80 [21.1] | Cont Int <sup>1)</sup> | 932<br>995 | Cont Int <sup>1)</sup> | 23 [30.8]<br>36 [48.2]     |
| HR 100 | 100 [6.1]                                                   | Cont Int <sup>1)</sup> Peak <sup>2)</sup> | 210 [3045]<br>310 [4495]<br>310 [4495] | Cont Int <sup>1)</sup> Peak <sup>2)</sup> | 205 [2972]<br>310 [4495]<br>310 [4495] | Cont Int <sup>1)</sup>     | 295 [217]<br>445 [328] | Cont Int <sup>1)</sup>        | 75 [19.8]<br>95 [25]   | Cont Int <sup>1)</sup> | 750<br>950 | Cont Int <sup>1)</sup> | 23.1 [30.9]<br>44.2 [59.2] |
| HR 130 | 125.7 [7.66]                                                | Cont Int <sup>1)</sup> Peak <sup>2)</sup> | 210 [3045]<br>310 [4495]<br>310 [4495] | Cont Int <sup>1)</sup> Peak <sup>2)</sup> | 205 [2972]<br>310 [4495]<br>310 [4495] | Cont Int <sup>1)</sup>     | 375 [276]<br>545 [401] | Cont Int <sup>1)</sup>        | 75 [19.8]<br>95 [25]   | Cont Int <sup>1)</sup> | 596<br>755 | Cont Int <sup>1)</sup> | 23.4 [31.3]<br>43.1 [57.7] |
| HR 160 | 160 [9.76]                                                  | Cont Int <sup>1)</sup> Peak <sup>2)</sup> | 210 [3045]<br>310 [4495]<br>310 [4495] | Cont Int <sup>1)</sup> Peak <sup>2)</sup> | 205 [2972]<br>260 [3770]<br>310 [4495] | Cont Int <sup>1)</sup>     | 465 [342]<br>570 [420] | Cont Int <sup>1)</sup>        | 75 [19.8]<br>95 [25]   | Cont Int <sup>1)</sup> | 468<br>593 | Cont Int <sup>1)</sup> | 18.2 [24.3]<br>22.5 [30.1] |
| HR 200 | 200 [12.2]                                                  | Cont Int <sup>1)</sup> Peak <sup>2)</sup> | 210 [3045]<br>310 [4495]<br>310 [4495] | Cont Int <sup>1)</sup> Peak <sup>2)</sup> | 205 [2972]<br>260 [3770]<br>310 [4495] | Cont Int <sup>1)</sup>     | 580 [427]<br>670 [494] | Cont Int <sup>1)</sup>        | 75 [19.8]<br>95 [25]   | Cont Int <sup>1)</sup> | 375<br>475 | Cont Int <sup>1)</sup> | 15.2 [20.3]<br>22.5 [30.1] |
| HR 250 | 250 [15.25]                                                 | Cont Int <sup>1)</sup> Peak <sup>2)</sup> | 210 [3045]<br>310 [4495]<br>310 [4495] | Cont Int <sup>1)</sup> Peak <sup>2)</sup> | 205 [2972]<br>260 [3770]<br>310 [4495] | Cont Int <sup>1)</sup>     | 710 [523]<br>820 [604] | Cont Int <sup>1)</sup>        | 75 [19.8]<br>95 [25]   | Cont Int <sup>1)</sup> | 300<br>380 | Cont Int <sup>1)</sup> | 14.2 [19]<br>19.5 [26.1]   |
| HR 315 | 314.5 [19.18]                                               | Cont Int <sup>1)</sup> Peak <sup>2)</sup> | 210 [3045]<br>310 [4495]<br>310 [4495] | Cont Int <sup>1)</sup> Peak <sup>2)</sup> | 205 [2972]<br>240 [3480]<br>310 [4495] | Cont Int <sup>1)</sup>     | 885 [652]<br>960 [707] | Cont Int <sup>1)</sup>        | 75 [19.8]<br>95 [25]   | Cont Int <sup>1)</sup> | 238<br>302 | Cont Int <sup>1)</sup> | 11 [14.7]<br>19.5 [26.1]   |
| HR 400 | 393 [23.97]                                                 | Cont Int <sup>1)</sup> Peak <sup>2)</sup> | 210 [3045]<br>310 [4495]<br>310 [4495] | Cont Int <sup>1)</sup> Peak <sup>2)</sup> | 155 [2247]<br>190 [2755]<br>225 [3250] | Cont Int <sup>1)</sup>     | 860 [633]<br>980 [722] | Cont Int <sup>1)</sup>        | 75 [19.8]<br>95 [25]   | Cont Int <sup>1)</sup> | 190<br>241 | Cont Int <sup>1)</sup> | 11 [14.7]<br>13 [17.4]     |

|                                    |             | HR 080                            | HR 100                            | HR 130                            | HR 160                            | HR 200                            | HR 250                            | HR 315                            | HR 400                            |
|------------------------------------|-------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Max starting pressure with no load | bar [psi]   | 11 [159]                          | 10 [145]                          | 10 [145]                          | 8 [116]                           | 8 [116]                           | 8 [116]                           | 8 [116]                           | 8 [116]                           |
| Min. starting torque (At. Max Δp)  | Nm [lbf·ft] | Cont. 180 [133]<br>Int. 270 [199] | Cont. 230 [169]<br>Int. 340 [250] | Cont. 300 [221]<br>Int. 420 [309] | Cont. 370 [272]<br>Int. 440 [324] | Cont. 465 [343]<br>Int. 522 [385] | Cont. 568 [419]<br>Int. 640 [472] | Cont. 700 [516]<br>Int. 760 [560] | Cont. 680 [501]<br>Int. 775 [571] |

<sup>1)</sup> Intermittent duty must not exceed 10% each minute.

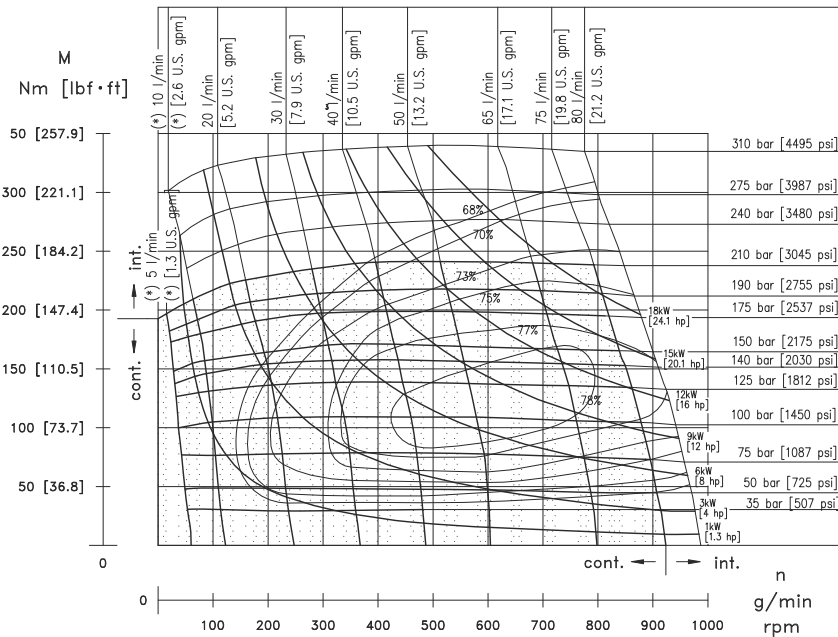
<sup>2)</sup> Peak duty must not exceed 1% each minute.

\* For motors with the shafts in the table below the Max. admis-sible torque is reduced as follows:

|                                         |             | CL254 CYLINDRICAL SHAFT |           | SE250 SPLINED SHAFT |           |
|-----------------------------------------|-------------|-------------------------|-----------|---------------------|-----------|
| * Max. admissible torque for shaft type | Nm [lbf·ft] | Cont                    | 300 [221] | Cont                | 360 [265] |
|                                         |             | Int <sup>1)</sup>       | 410 [302] | Int <sup>1)</sup>   | 450 [332] |

<sup>1)</sup> Intermittent duty must not exceed 10% each minute.

## HR 080

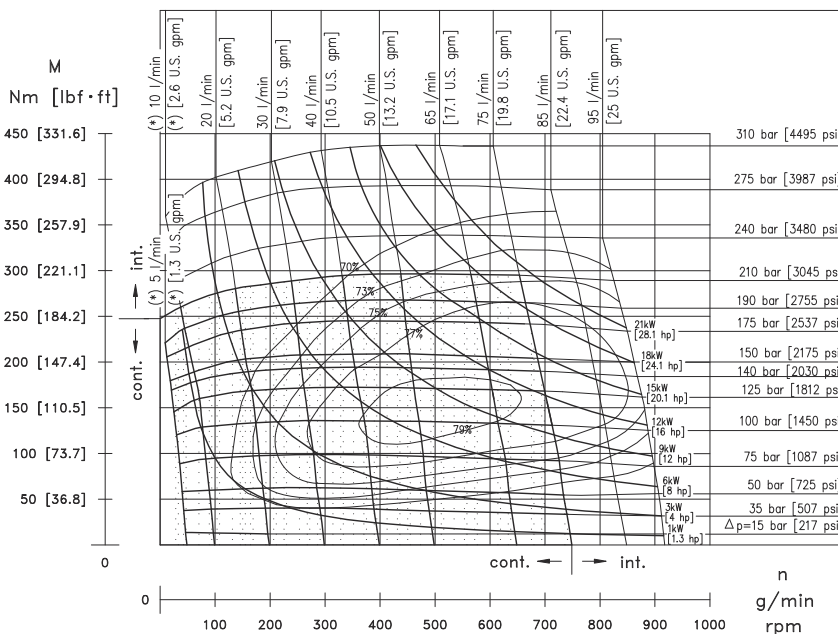


Exceeding continuous pressure values or exceeding flow values indicated, must not occur simultaneously.

(\*) Performances data are referred to standard motors.

For obtain higher performances, when the motor is used with flow < 10 l/min [< 2.64 U.S. gpm], we suggest to use LW (Low Leakage) version.

## HR 100

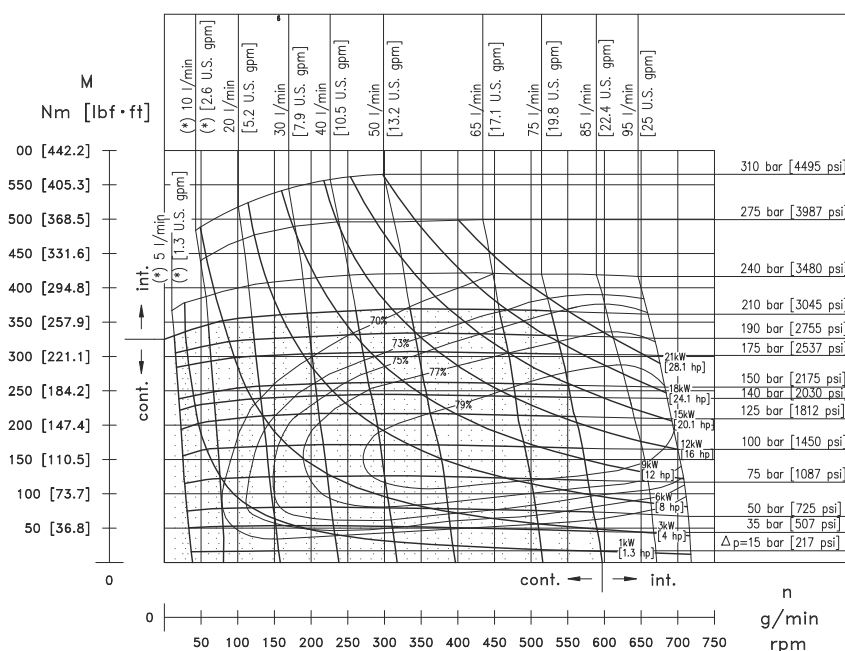


Exceeding continuous pressure values or exceeding flow values indicated, must not occur simultaneously.

(\*) Performances data are referred to standard motors.

For obtain higher performances, when the motor is used with flow < 10 l/min [< 2.64 U.S. gpm], we suggest to use LW (Low Leakage) version.

## HR 130

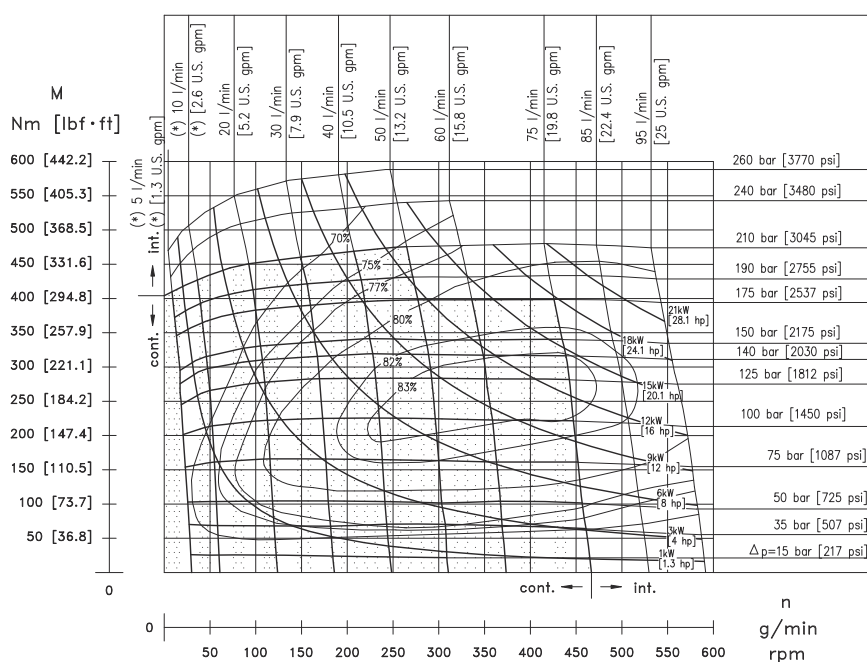


Exceeding continuous pressure values or exceeding flow values indicated, must not occur simultaneously.

(\*) Performances data are referred to standard motors.

For obtain higher performances, when the motor is used with flow < 10 l/min [< 2.64 U.S. gpm], we suggest to use LW (Low Leakage) version.

## HR 160

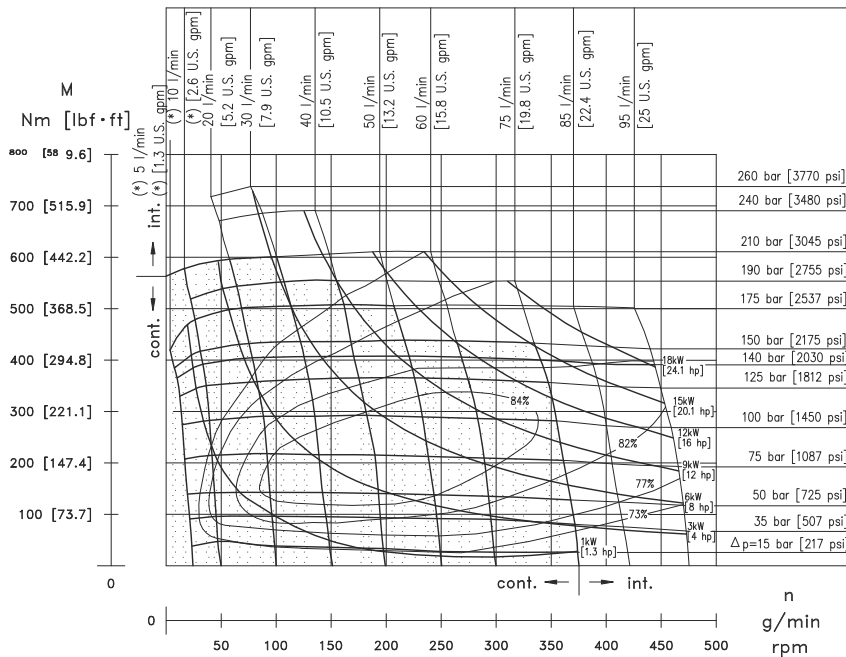


Exceeding continuous pressure values or exceeding flow values indicated, must not occur simultaneously.

(\*) Performances data are referred to standard motors.

For obtain higher performances, when the motor is used with flow < 10 l/min [< 2.64 U.S. gpm], we suggest to use LW (Low Leakage) version.

## HR 200

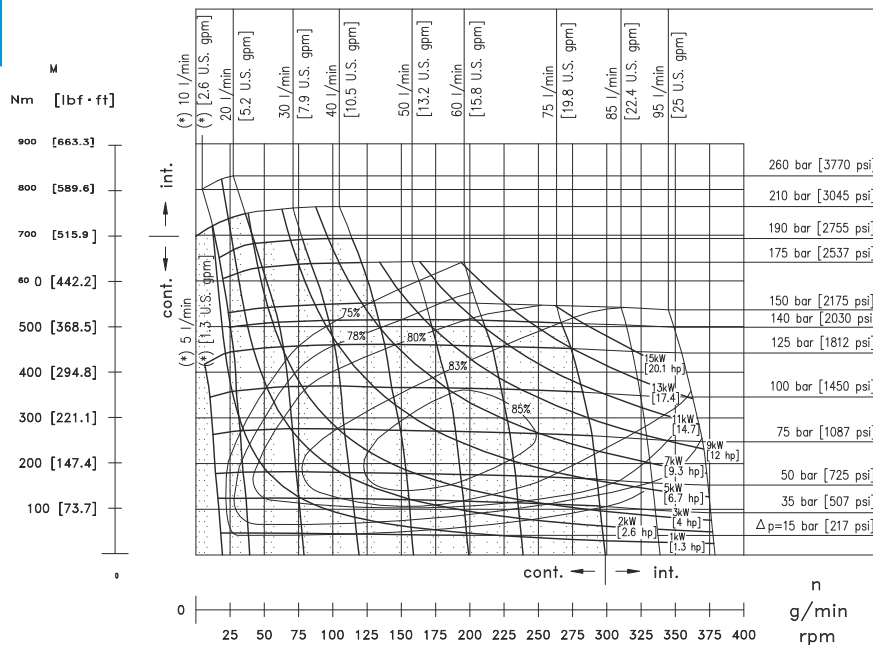


Exceeding continuous pressure values or exceeding flow values indicated, must not occur simultaneously.

(\*) Performances data are referred to standard motors.

For obtain higher performances, when the motor is used with flow < 10 l/min [< 2.64 U.S. gpm], we suggest to use LW (Low Leakage) version.

## HR 250

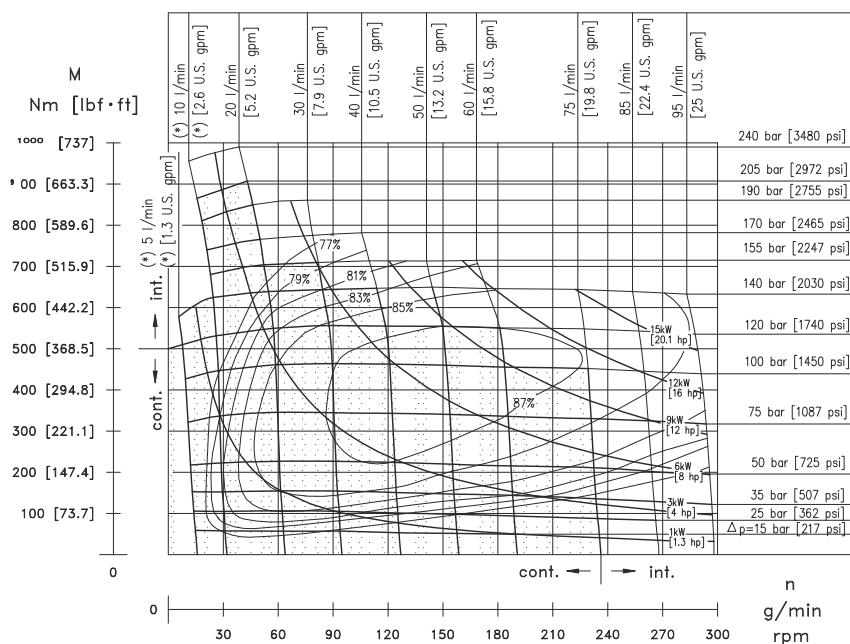


Exceeding continuous pressure values or exceeding flow values indicated, must not occur simultaneously.

(\*) Performances data are referred to standard motors.

For obtain higher performances, when the motor is used with flow < 10 l/min [< 2.64 U.S. gpm], we suggest to use LW (Low Leakage) version.

## HR 315

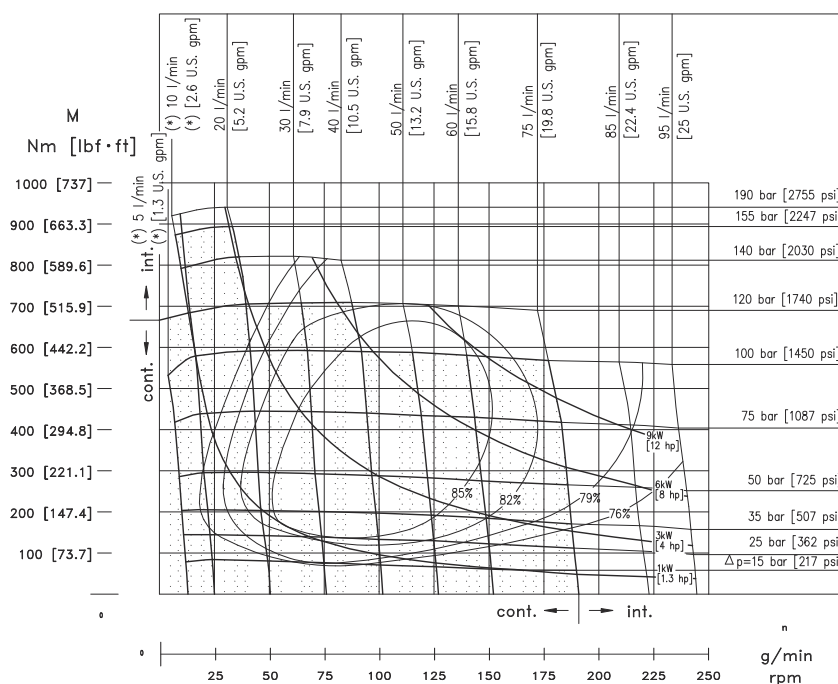


Exceeding continuous pressure values or exceeding flow values indicated, must not occur simultaneously.

(\*) Performances data are referred to standard motors.

For obtain higher performances, when the motor is used with flow < 10 l/min [< 2.64 U.S. gpm], we suggest to use LW (Low Leakage) version.

## HR 400



Exceeding continuous pressure values or exceeding flow values indicated, must not occur simultaneously.

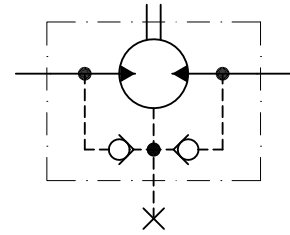
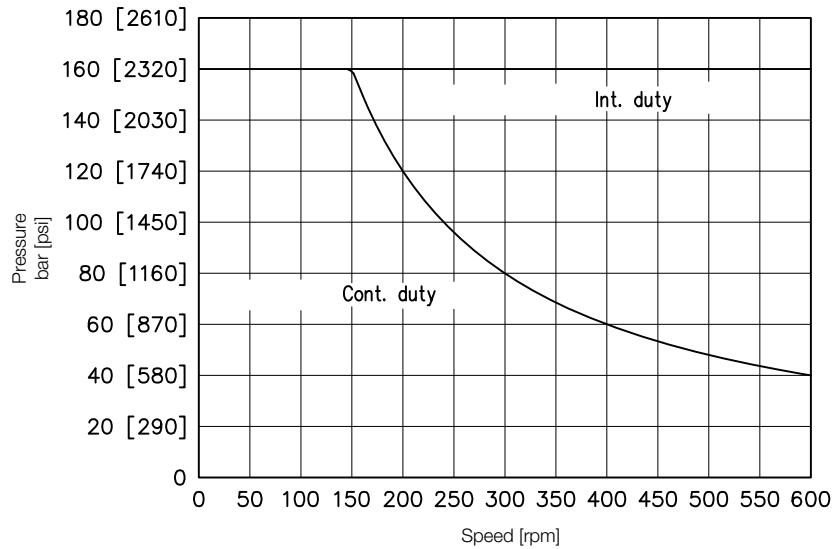
(\*) Performances data are referred to standard motors.

For obtain higher performances, when the motor is used with flow < 10 l/min [< 2.64 U.S. gpm], we suggest to use LW (Low Leakage) version.

## Max. Permissible Shaft Seal Pressure

Max. return pressure without drain line or max. pressure in the drain line.

For pressure and speeds not showed in the curve below, please contact Dana Brevini.



## Pressure Loss

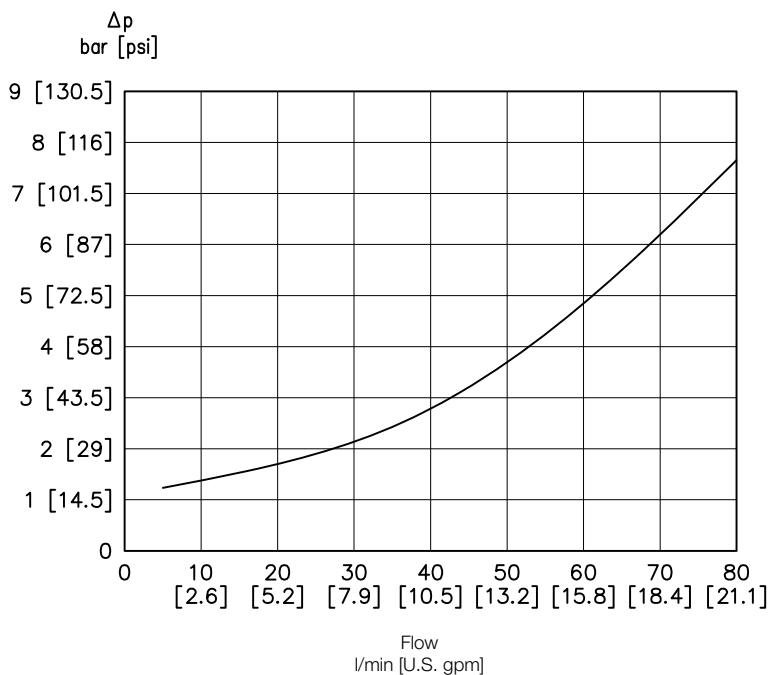
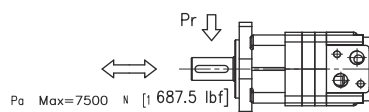
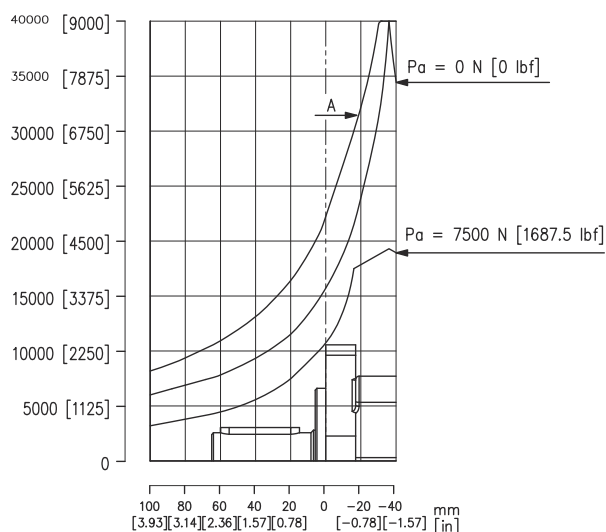


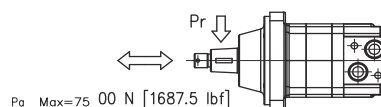
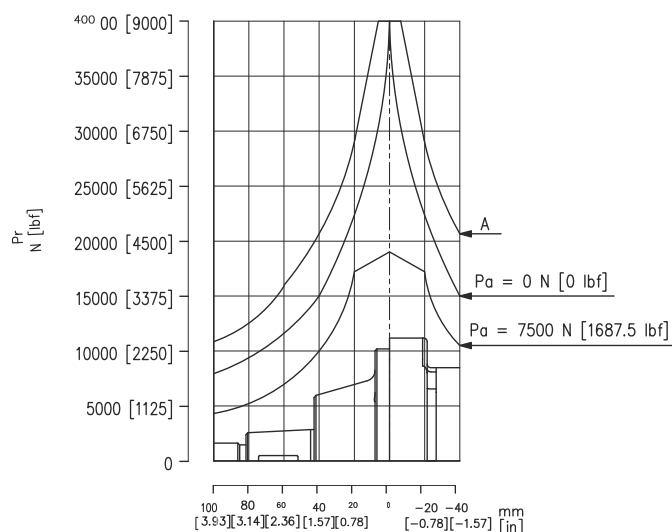
Diagram according to tests done with a relevant number of motors and using hydraulic oil with cinematic viscosity of 37 cSt at 45 C° temperature.

## Shaft Load

## S Version - F Version



## W Version - L Version



Loads diagram is for a bearings life  $L_{10h}$  of 1600 hours at 200 rpm when mineral base hydraulic oil with a sufficient content of anti-wear additives is used. Bearing life calculation refers to a 90% degree of reliability.

Curve "A" shows the maximum radial load that can be taken by the bearings under maximum static load duty.

The following alphanumeric digits system has been developed to identify all of the configuration options for the HR motors. Use the model code below to specify the desired features. All alphanumeric digits system of the code must be present when ordering. We recommend to carefully read the catalogue before filling the ordering code.

| 1      | 2            | 3       | 4            | 5         | 6         | 7    | 8     | 9             | 10             | 11     | 12              | 13       |
|--------|--------------|---------|--------------|-----------|-----------|------|-------|---------------|----------------|--------|-----------------|----------|
| Series | Displacement | Version | Mount flange | Shaft end | Main port | Seal | Valve | Valve feature | Flushing valve | Option | Version feature | Painting |
| HR     | 200          | S       | A4           | CL025     | M09       | N    | M091  | 032           | 06             | TZ     | OKK             | 01       |

| 1  | Series        |  |
|----|---------------|--|
| HR | Orbital motor |  |

| 2   | Displacement                                           |  |
|-----|--------------------------------------------------------|--|
| 080 | 80 cm <sup>3</sup> /giro [4.88 in <sup>3</sup> /rev]   |  |
| 100 | 100 cm <sup>3</sup> /giro [6.1 in <sup>3</sup> /rev]   |  |
| 130 | 130 cm <sup>3</sup> /giro [7.93 in <sup>3</sup> /rev]  |  |
| 160 | 160 cm <sup>3</sup> /giro [9.76 in <sup>3</sup> /rev]  |  |
| 200 | 200 cm <sup>3</sup> /giro [12.2 in <sup>3</sup> /rev]  |  |
| 250 | 250 cm <sup>3</sup> /giro [15.25 in <sup>3</sup> /rev] |  |
| 315 | 315 cm <sup>3</sup> /giro [19.21 in <sup>3</sup> /rev] |  |
| 400 | 400 cm <sup>3</sup> /giro [24.4 in <sup>3</sup> /rev]  |  |

| 3 | Version                                |  |
|---|----------------------------------------|--|
| S | Standard Version                       |  |
| W | Wheel Version                          |  |
| C | Bearingless Version                    |  |
| M | Short Bearingless Version for Gear Box |  |
| F | Brake Version                          |  |
| L | Wheel Version with brake               |  |

| 4  | Mounting Flange                |  | Version |   |   |   |    |   |
|----|--------------------------------|--|---------|---|---|---|----|---|
|    |                                |  | S       | W | C | M | F  | L |
| M4 | Short flange for Gear Box      |  | -       | - | - | ● | -  | - |
| A4 | 4 Bolt Ø 82.5 mm [Ø 3.2 in]    |  | ●       | - | - | - | ●  | - |
| A2 | SAE A 2 Bolt                   |  | ●       | - | - | - | 1) | - |
| B4 | ISO 4 Bolt Ø 100 mm [Ø 3.9 in] |  | -       | - | ● | - | -  | - |
| CM | ISO 4 Bolt Ø 125 mm [Ø 4.9 in] |  | -       | ● | - | - | -  | ● |

1) On request

● Available

- Not Available

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| Shaft end    |                                                   | Version |   |   |   |   |   |
|--------------|---------------------------------------------------|---------|---|---|---|---|---|
|              |                                                   | S       | W | C | M | F | L |
| <b>DB001</b> | Dog Bone T=12 12/24 DP                            | -       | - | ● | ● | - | - |
| <b>CL025</b> | Parallel keyed Ø25 mm [0.97 in]                   | ●       | - | - | - | - | - |
| <b>CL254</b> | Parallel keyed Ø25.4 mm [1 in]                    | ●       | - | - | - | - | - |
| <b>C3175</b> | Parallel keyed Ø31.75 mm [1.23 in]                | ●       | - | - | - | - | - |
| <b>CL320</b> | Parallel keyed Ø32 mm [1.24]                      | ●       | ● | - | - | ● | ● |
| <b>CN320</b> | Tapered Shaft                                     | ●       | ● | - | - | ● | ● |
| <b>SE250</b> | Splined Shaft (SAE 6B 1" spline)                  | ●       | - | - | - | - | - |
| <b>SC320</b> | Splined Shaft (ASA 12/24 spline) - Europe Version | ●       | ● | - | - | - | - |
| <b>SE320</b> | Splined Shaft (ASA 12/24 spline) - USA Version    | ●       | - | - | - | - | - |
| <b>SE350</b> | Splined Shaft (P.t.o. DIN 9611 Form1)             | ●       | - | - | - | - | - |

6

| Main Port  |                                                    | Version |   |   |   |   |   |
|------------|----------------------------------------------------|---------|---|---|---|---|---|
|            |                                                    | S       | W | C | M | F | L |
| <b>M09</b> | 1/2 G BSPP (32x22) Main Ports (standard)           | ●       | ● | ● | ● | ● | ● |
| <b>S09</b> | 7/8" - 14 UNF (32x22) Main Ports                   | ●       | ● | ● | - | ● | ● |
| <b>L09</b> | 1" 1/16 - 12 UN (Main Ports Positioned 180° apart) | ●       | ● | ● | - | ● | ● |
| <b>F09</b> | 1" 1/16 - 12 UN (End Main Ports)                   | ●       | ● | ● | - | ● | ● |

7

| Seal     |                |
|----------|----------------|
| <b>N</b> | NBR (standard) |
| <b>V</b> | FKM            |

8

| Valve       |                                                                    | Main Port |     |     |     |
|-------------|--------------------------------------------------------------------|-----------|-----|-----|-----|
|             |                                                                    | M09       | S09 | L09 | F09 |
| <b>xxxx</b> | Not required                                                       | ●         | ●   | ●   | ●   |
| <b>M091</b> | Pressure relief valve VAF 09 - D                                   | ●         | -   | -   | -   |
| <b>M092</b> | Anticavitation and Anti-Shock Valve VAAF 09 / 40                   | ●         | -   | -   | -   |
| <b>M093</b> | Overcentre Valve with VCD1 09 - S/AF                               | ●         | -   | -   | -   |
| <b>M094</b> | Double-acting overcentre valve with shuttle valve VCR1 09 - D/AF   | ●         | -   | -   | -   |
| <b>M095</b> | Double-acting overcentre valve with shuttle valve VCR1 09 D/AF LDP | ●         | -   | -   | -   |
| <b>M096</b> | Flow Control Valve VRP 09                                          | ●         | -   | -   | -   |
| <b>M097</b> | Pressure relief valve VAF 09 - D/AF                                | ●         | -   | -   | -   |



● Available  
- Not Available

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| Valve |                                           | Valve |      |      |      |      |      |      |      |
|-------|-------------------------------------------|-------|------|------|------|------|------|------|------|
|       |                                           | xxxx  | M091 | M092 | M093 | M094 | M095 | M096 | M097 |
| 000   | Feature not necessary                     | ●     | -    | -    | -    | -    | -    | -    | -    |
| 032   | Not Set (50÷100 bar [725 to 1450 psi])    | -     | ●    | -    | -    | -    | -    | -    | -    |
| 018   | Not Set (50÷210 bar [725 to 3045 psi])    | -     | -    | ●    | -    | -    | -    | -    | -    |
| 029   | Not Set (30÷220 bar [435 to 3190 psi])    | -     | -    | -    | -    | ●    | ●    | -    | -    |
| 019   | Not Set (Max pressure 315 bar [4567 psi]) | -     | -    | -    | -    | -    | -    | ●    | -    |
| 020   | Not Set (100÷200 bar [1450 to 2900 psi])  | -     | ●    | -    | -    | -    | -    | -    | -    |
| 022   | Not Set (100÷280 bar [1450 to 4060 psi])  | -     | -    | -    | -    | -    | -    | -    | ●    |
| 70D   | Pilot Ratio 7:1 - Control rotation CW     | -     | -    | -    | ●    | -    | -    | -    | -    |
| 70S   | Pilot Ratio 7:1 - Control rotation CCW    | -     | -    | -    | ●    | -    | -    | -    | -    |
| 30D   | Pilot Ratio 3:1 - Control rotation CW     | -     | -    | -    | ●    | -    | -    | -    | -    |
| 30S   | Pilot Ratio 3:1 - Control rotation CCW    | -     | -    | -    | ●    | -    | -    | -    | -    |

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| Flushing Valve (*) |                                                   | Main Port |     |     |     |
|--------------------|---------------------------------------------------|-----------|-----|-----|-----|
|                    |                                                   | M09       | S09 | L09 | F09 |
| xx                 | Not required                                      | ●         | ●   | ●   | ●   |
| 06                 | VSC/F Flushing valve - 6 l/min [1.58 U.S. gpm]    | ●         | ●   | -   | -   |
| 09                 | VSC/F Flushing valve - 10.5 l/min [2.77 U.S. gpm] | ●         | ●   | -   | -   |
| 15                 | VSC/F Flushing valve - 15 l/min [3.96 U.S. gpm]   | ●         | ●   | -   | -   |

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| Option |                                                      | Version |   |   |   |   |   |
|--------|------------------------------------------------------|---------|---|---|---|---|---|
|        |                                                      | S       | W | C | M | F | L |
| xx     | None                                                 | ●       | ● | ● | ● | ● | ● |
| 03     | Reverse rotation                                     | ●       | ● | ● | ● | ● | ● |
| TZ     | Tachometer + sensor 2-channel-Hall effect (30 pulse) | ●       | - | - | - | - | - |
| ZT     | Tachometer + sensor 2-channel-Hall effect (55 pulse) | ●       | - | - | - | - | - |
| ZJ     | Tachometer + 9046087 sensor Hall effect (55 pulse)   | ●       | - | - | - | - | - |

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| Shaft end |                                                                                      | Version |   |                 |   |   |   |
|-----------|--------------------------------------------------------------------------------------|---------|---|-----------------|---|---|---|
|           |                                                                                      | S       | W | C               | M | F | L |
| xxx       | Standard version                                                                     | ●       | ● | -               | - | ● | ● |
| OKK       | Double drain port 1/4 G (BSPP) (at delivery side)                                    | ●       | ● | -               | - | - | - |
| SKK       | Double drain port 7/16" - 20UNF (at delivery side)                                   | ●       | ● | -               | - | - | - |
| LWK       | Low leakage                                                                          | ●       | ● | ●               | ● | ● | ● |
| SWK       | Double drain port 7/16" - 20UNF (at delivery side) + Low leakage                     | ●       | ● | ● <sup>1)</sup> | - | - | - |
| KWK       | Double drain port 1/4 G (BSPP) (at delivery side) + Low leakage                      | ●       | ● | ● <sup>1)</sup> | - | - | - |
| 03K       | Brevini SDU31 gear box Version + Low leakage                                         | -       | - | -               | ● | - | - |
| 04K       | 12 Springs / 10 Contacts Version (available with displacement 100-315)               | -       | - | -               | - | ● | ● |
| 05K       | 8 Springs Version (available with displacement 250 - 315 - 400)                      | -       | - | -               | - | ● | ● |
| 06K       | Increased braking torque Version (available with displacement 200-250)               | -       | - | -               | - | ● | ● |
| 08K       | Low leakage + 8 Springs Version (available with displacement 250 - 315 - 400)        | -       | - | -               | - | ● | ● |
| 09K       | Increased braking torque Version (available with displacement 200-250) + Low leakage | -       | - | -               | - | ● | ● |
| 10K       | Brake housing SAE ports                                                              | -       | - | -               | - | - | - |

\*) It is possible to combine the flushing valves only with VAF 09 - D valve.

1) Assembly, please contact Dana Brevini for further information.

● Available  
- Not Available

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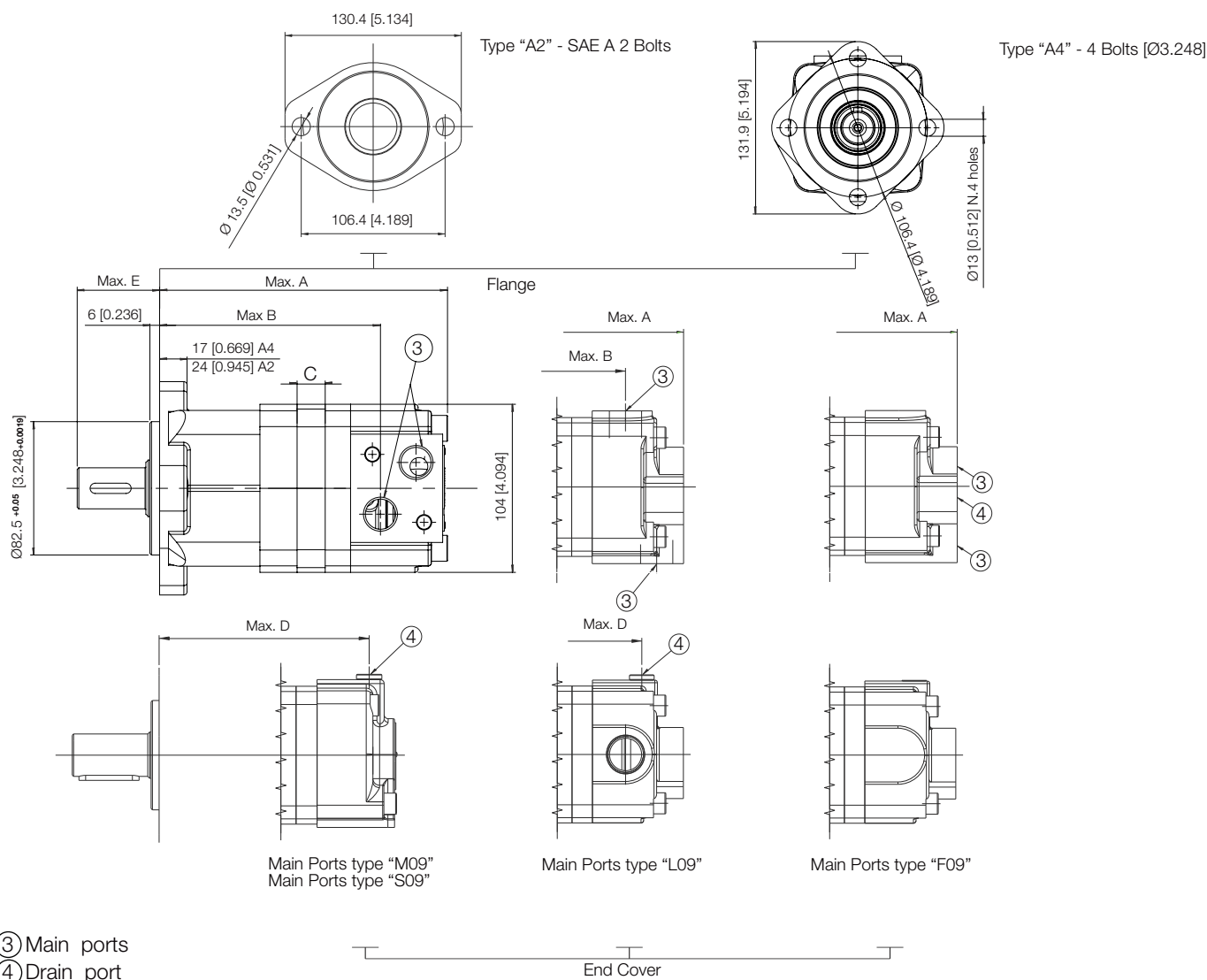
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## Painting

|           |                        |
|-----------|------------------------|
| <b>xx</b> | Not Painted            |
| <b>01</b> | Black Painted RAL 9005 |
| <b>02</b> | Blue Painted RAL 5015  |
| <b>05</b> | Gray Painted RAL 7016  |



## HR S A2/A4 M09/S09/L09/F09



③ Main ports  
④ Drain port

\* For shafts dimensions see page



\* For main ports dimensions see page



| Main Ports type "S09"                                     |                 |                 |                |                 |                 |                 |                 |                 |
|-----------------------------------------------------------|-----------------|-----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Displ.<br>cm <sup>3</sup> /giro<br>[in <sup>3</sup> /rev] | 080<br>[4.8]    | 100<br>[6.1]    | 130<br>[7.9]   | 160<br>[9.7]    | 200<br>[12.2]   | 250<br>[15.2]   | 315<br>[19.2]   | 400<br>[24.4]   |
| <b>A</b><br>mm [in]                                       | 174.5<br>[6.87] | 177.5<br>[6.98] | 182<br>[7.16]  | 188<br>[7.40]   | 195<br>[7.67]   | 203.5<br>[8.01] | 215<br>[8.46]   | 228.5<br>[8.99] |
| <b>B</b><br>mm [in]                                       | 134<br>[5.27]   | 137.5<br>[5.41] | 142<br>[5.59]  | 148<br>[5.82]   | 155<br>[6.10]   | 164<br>[6.45]   | 175<br>[6.88]   | 188.5<br>[7.42] |
| <b>C</b><br>mm [in]                                       | 14<br>[0.551]   | 17.4<br>[0.68]  | 21.8<br>[0.85] | 27.8<br>[1.09]  | 34.8<br>[1.37]  | 43.5<br>[1.71]  | 54.8<br>[2.15]  | 68.4<br>[2.69]  |
| <b>D</b><br>mm [in]                                       | 154<br>[6.06]   | 157<br>[6.18]   | 161<br>[6.33]  | 167.5<br>[6.59] | 174.5<br>[6.87] | 183.5<br>[7.22] | 194.5<br>[7.65] | 208<br>[8.18]   |
| <b>Weight</b><br>kg [lb]                                  | 10.5<br>[23.1]  | 10.7<br>[23.6]  | 11<br>[24.5]   | 11.4<br>[25.1]  | 11.8<br>[26]    | 12.4<br>[27.3]  | 13.1<br>[28.8]  | 14<br>[30.8]    |

| Main Ports type "L09" - Main Ports type "F09" - Main Ports type "R09" |                |                 |                 |                 |                 |                 |                 |                 |
|-----------------------------------------------------------------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Displ.<br>cm <sup>3</sup> /giro<br>[in <sup>3</sup> /rev]             | 080<br>[4.8]   | 100<br>[6.1]    | 130<br>[7.9]    | 160<br>[9.7]    | 200<br>[12.2]   | 250<br>[15.2]   | 315<br>[19.2]   | 400<br>[24.4]   |
| <b>A</b><br>mm [in]                                                   | 185<br>[7.28]  | 188<br>[7.40]   | 192.5<br>[7.57] | 198.5<br>[7.81] | 205.5<br>[8.09] | 214<br>[8.42]   | 225.5<br>[8.87] | 239<br>[9.40]   |
| <b>B</b><br>mm [in]                                                   | 140<br>[5.51]  | 143.5<br>[5.64] | 148<br>[5.82]   | 154<br>[6.06]   | 161<br>[6.33]   | 170<br>[6.69]   | 181<br>[7.12]   | 194.5<br>[7.65] |
| <b>C</b><br>mm [in]                                                   | 14<br>[0.551]  | 17.4<br>[0.68]  | 21.8<br>[0.85]  | 27.8<br>[1.09]  | 34.8<br>[1.37]  | 43.5<br>[1.71]  | 54.8<br>[2.15]  | 68.4<br>[2.69]  |
| <b>D</b><br>mm [in]                                                   | 153<br>[6.02]  | 156<br>[6.14]   | 160<br>[6.29]   | 166.5<br>[6.55] | 173.5<br>[6.83] | 182.5<br>[7.18] | 193.5<br>[7.61] | 207<br>[8.14]   |
| <b>Weight</b><br>kg [lb]                                              | 10.5<br>[23.1] | 10.7<br>[23.6]  | 11<br>[24.5]    | 11.4<br>[25.1]  | 11.8<br>[26]    | 12.4<br>[27.3]  | 13.1<br>[28.8]  | 14<br>[30.8]    |

| SHAFT               | CL320        | C3175        | CL254        | CN320          | SE250        | SE320          | SC320        | SE350         |
|---------------------|--------------|--------------|--------------|----------------|--------------|----------------|--------------|---------------|
| <b>E</b><br>mm [in] | 65<br>[2.55] | 56<br>[2.20] | 51<br>[2.00] | 65.9<br>[2.59] | 51<br>[2.00] | 55.9<br>[2.20] | 65<br>[2.55] | 110<br>[4.29] |

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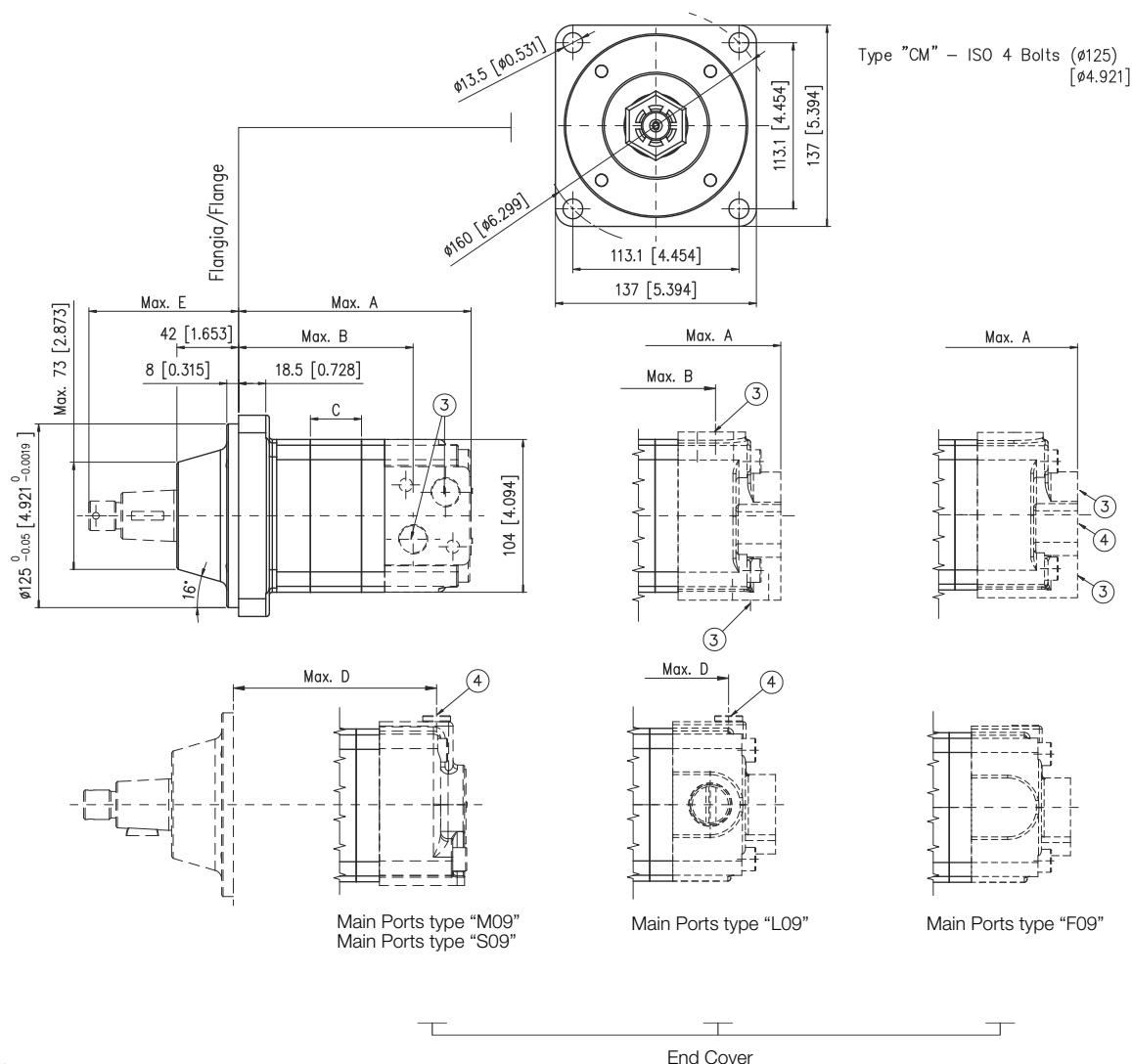
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## HR W CM M09/S09/L09/F09



- ③ Main ports
- ④ Drain port

\* For shafts dimensions see page



\* For main ports dimensions see page



| Main Ports type "M09" - Main Ports type "S09"             |                 |                 |                 |                 |                 |                 |                 |                 |
|-----------------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Displ.<br>cm <sup>3</sup> /giro<br>[in <sup>3</sup> /rev] | 080<br>[4.8]    | 100<br>[6.1]    | 130<br>[7.9]    | 160<br>[9.7]    | 200<br>[12.2]   | 250<br>[15.2]   | 315<br>[19.2]   | 400<br>[24.4]   |
| <b>A</b><br>mm [in]                                       | 136.5<br>[5.37] | 140<br>[5.51]   | 144.5<br>[5.68] | 150.5<br>[5.92] | 157.5<br>[6.20] | 166<br>[6.53]   | 177.5<br>[6.98] | 191<br>[7.51]   |
| <b>B</b><br>mm [in]                                       | 97.5<br>[3.83]  | 101<br>[3.97]   | 105.3<br>[4.14] | 111.3<br>[4.38] | 118.3<br>[4.65] | 127<br>[5.00]   | 138.5<br>[5.45] | 152<br>[5.98]   |
| <b>C</b><br>mm [in]                                       | 14<br>[0.551]   | 17.4<br>[0.68]  | 21.8<br>[0.85]  | 27.8<br>[1.09]  | 34.8<br>[1.37]  | 43.5<br>[1.71]  | 54.8<br>[2.15]  | 68.4<br>[2.69]  |
| <b>D</b><br>mm [in]                                       | 117<br>[4.60]   | 120.5<br>[4.74] | 124.8<br>[4.91] | 130.8<br>[5.14] | 137.8<br>[5.42] | 146.5<br>[5.76] | 158<br>[6.22]   | 171.5<br>[6.75] |
| <b>Weight</b><br>kg [lb]                                  | 10.9<br>[24]    | 11.1<br>[24.4]  | 11.5<br>[25.3]  | 11.8 [26]       | 12.2<br>[26.8]  | 12.9<br>[28.4]  | 13.6<br>[29.9]  | 14.4<br>[31.7]  |

| Main Ports type "L09" - Main Ports type "F09" - Main Ports type "R09" |                 |                |                 |                 |                 |                |                 |                |
|-----------------------------------------------------------------------|-----------------|----------------|-----------------|-----------------|-----------------|----------------|-----------------|----------------|
| Displ.<br>cm <sup>3</sup> /giro<br>[in <sup>3</sup> /rev]             | 080<br>[4.8]    | 100<br>[6.1]   | 130<br>[7.9]    | 160<br>[9.7]    | 200<br>[12.2]   | 250<br>[15.2]  | 315<br>[19.2]   | 400<br>[24.4]  |
| <b>A</b><br>mm [in]                                                   | 149.5<br>[5.88] | 153<br>[6.02]  | 157.5<br>[6.20] | 163.5<br>[6.43] | 170.5<br>[6.71] | 179<br>[7.04]  | 190.5<br>[7.50] | 204<br>[8.03]  |
| <b>B</b><br>mm [in]                                                   | 103.5<br>[4.07] | 107<br>[4.21]  | 111.3<br>[4.38] | 117.3<br>[4.61] | 124.3<br>[4.89] | 133<br>[5.23]  | 144.5<br>[5.68] | 158<br>[6.22]  |
| <b>C</b><br>mm [in]                                                   | 14<br>[0.551]   | 17.4<br>[0.68] | 21.8<br>[0.85]  | 27.8<br>[1.09]  | 34.8<br>[1.37]  | 43.5<br>[1.71] | 54.8<br>[2.15]  | 68.4<br>[2.69] |
| <b>D</b><br>mm [in]                                                   | 114.5<br>[4.50] | 118<br>[4.64]  | 122.3<br>[4.81] | 128.3<br>[5.05] | 135.5<br>[5.33] | 144<br>[5.66]  | 155.5<br>[6.12] | 169<br>[6.65]  |
| <b>Weight</b><br>kg [lb]                                              | 10.9<br>[24]    | 11.1<br>[24.4] | 11.5<br>[25.3]  | 11.8 [26]       | 12.2<br>[26.8]  | 12.9<br>[28.4] | 13.6<br>[29.9]  | 14.4<br>[31.7] |

| SHAFT               | CL320         | CN320         | SC320         |
|---------------------|---------------|---------------|---------------|
| <b>E</b><br>mm [in] | 101<br>[3.97] | 102<br>[4.01] | 101<br>[3.97] |

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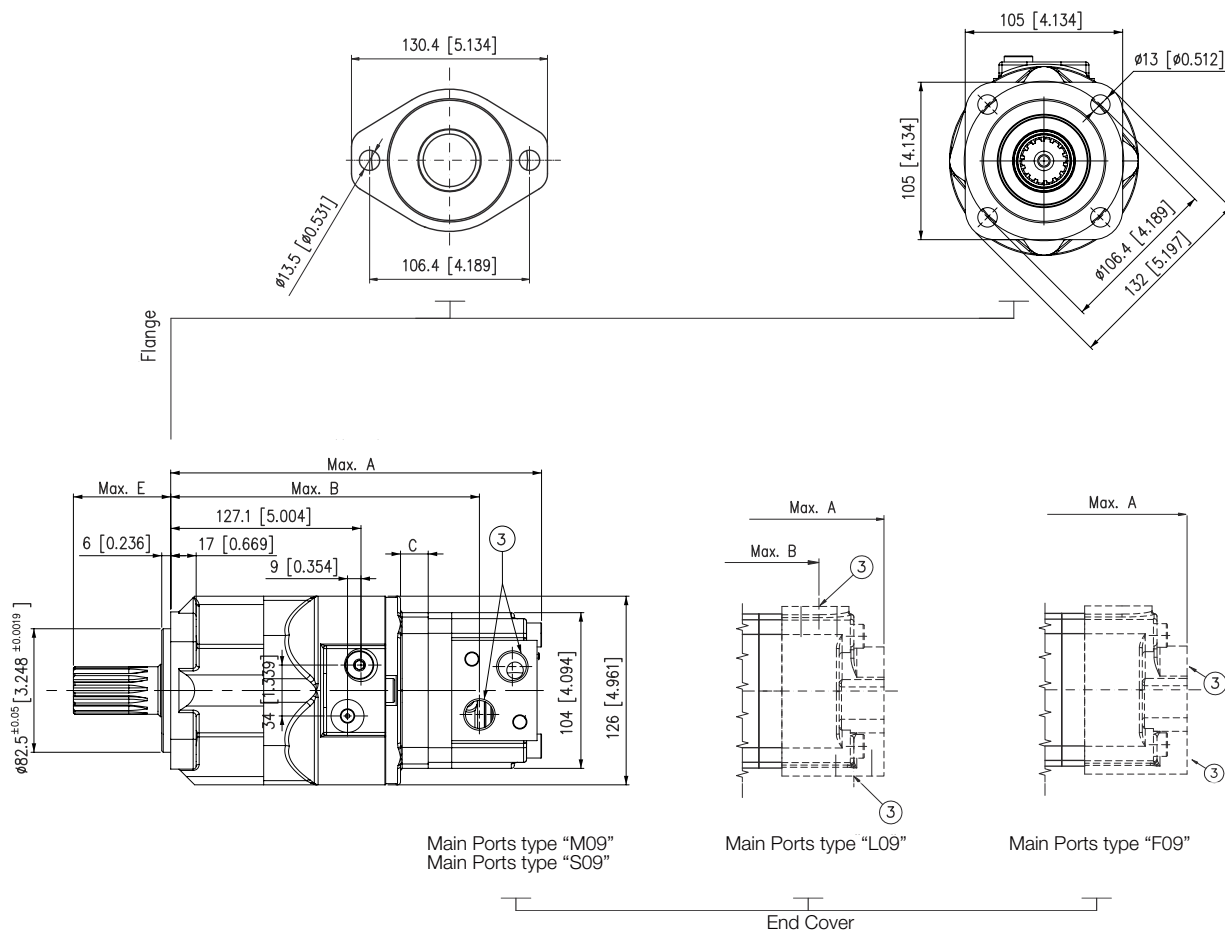
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## HR F A2/A4 M09/S09/L09/F09

Type "A2" – SAE A 2 Bolts

Type "A4" – 4 Bolts [Ø3.248]

Main Ports type "M09"  
Main Ports type "S09"

Main Ports type "L09"

Main Ports type "F09"

End Cover

- ① 1/8 G (BSPP) Brake releasing plug, thread depth 11 mm [0.42 in] (ISO)  
7/16" - 20 UNF Brake releasing plug, thread depth 11 mm [0.42 in] (SAE)
- ② 1/4 G (BSPP) Drain port, thread depth 11 mm [0.42 in] (ISO)  
7/16" - 20 UNF Drain port, thread depth 11 mm [0.42 in] (SAE)
- ③ Main ports

\* For shafts dimensions see page



\* For main ports dimensions see page



\* For brake feature see page



Main Ports type "M09" - Main Ports type "S09"

| Displ.<br>cm <sup>3</sup> /giro<br>[in <sup>3</sup> /rev] | 080<br>[4.8]    | 100<br>[6.1]    | 130<br>[7.9]    | 160<br>[9.7]     | 200<br>[12.2]    | 250<br>[15.2]    | 315<br>[19.2]    | 400<br>[24.4]    |
|-----------------------------------------------------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|------------------|------------------|
| <b>A</b><br>mm [in]                                       | 243.3<br>[9.57] | 246.7<br>[9.71] | 251.1<br>[9.88] | 257.1<br>[10.12] | 264.1<br>[10.39] | 272.8<br>[10.74] | 284.1<br>[11.18] | 297.7<br>[11.72] |
| <b>B</b><br>mm [in]                                       | 203.8<br>[8.02] | 207.2<br>[8.15] | 211.6<br>[8.33] | 217.6<br>[8.56]  | 224.6<br>[8.84]  | 233.3<br>[9.18]  | 244.6<br>[9.62]  | 258.2<br>[10.16] |
| <b>C</b><br>mm [in]                                       | 14<br>[0.551]   | 17.4<br>[0.68]  | 21.8<br>[0.85]  | 27.8<br>[1.09]   | 34.8<br>[1.37]   | 43.5<br>[1.71]   | 54.8<br>[2.15]   | 68.4<br>[2.69]   |
| <b>Weight</b><br>kg [lb]                                  | 17.3<br>[38.1]  | 17.5<br>[38.5]  | 17.9<br>[39.4]  | 18.2<br>[40.1]   | 18.6<br>[40.9]   | 19.3<br>[42.5]   | 20<br>[44]       | 20.8<br>[45.8]   |

Main Ports type "L09" - Main Ports type "F09" - Main Ports type "R09"

| Displ.<br>cm <sup>3</sup> /giro<br>[in <sup>3</sup> /rev] | 080<br>[4.8]     | 100<br>[6.1]     | 130<br>[7.9]     | 160<br>[9.7]     | 200<br>[12.2]    | 250<br>[15.2]    | 315<br>[19.2]    | 400<br>[24.4]    |
|-----------------------------------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| <b>A</b><br>mm [in]                                       | 254.3<br>[10.01] | 257.7<br>[10.14] | 262.1<br>[10.31] | 268.1<br>[10.55] | 275.1<br>[10.83] | 283.8<br>[11.17] | 295.1<br>[11.61] | 308.7<br>[12.15] |
| <b>B</b><br>mm [in]                                       | 209.8<br>[8.25]  | 213.2<br>[8.39]  | 217.6<br>[8.56]  | 223.6<br>[8.80]  | 230.6<br>[9.07]  | 239.3<br>[9.42]  | 250.6<br>[9.86]  | 264.2<br>[10.40] |
| <b>C</b><br>mm [in]                                       | 14<br>[0.551]    | 17.4<br>[0.68]   | 21.8<br>[0.85]   | 27.8<br>[1.09]   | 34.8<br>[1.37]   | 43.5<br>[1.71]   | 54.8<br>[2.15]   | 68.4<br>[2.69]   |
| <b>Weight</b><br>kg [lb]                                  | 17.3<br>[38.1]   | 17.5<br>[38.5]   | 17.9<br>[39.4]   | 18.2<br>[40.1]   | 18.6<br>[40.9]   | 19.3<br>[42.5]   | 20<br>[44]       | 20.8<br>[45.8]   |

| SHAFT               | CL320        | CN320          |
|---------------------|--------------|----------------|
| <b>E</b><br>mm [in] | 65<br>[2.55] | 65.9<br>[2.59] |

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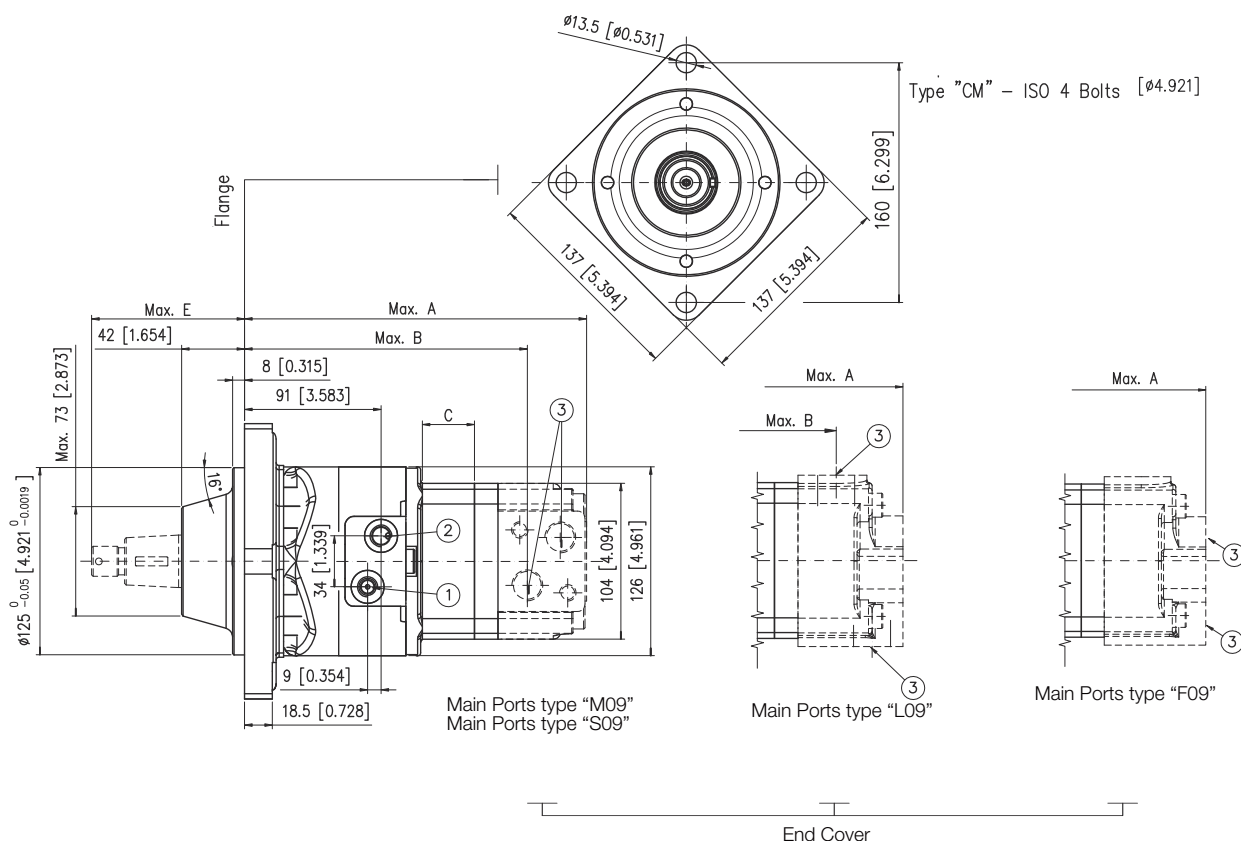
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## HR L CM M09/S09/L09/F09



- ① 1/8 G (BSPP) Brake releasing plug, thread depth 11 mm [0.42 in] (ISO)  
7/16" - 20 UNF Brake releasing plug, thread depth 11 mm [0.42 in] (SAE)
- ② 1/4 G (BSPP) Drain port, thread depth 11 mm [0.42 in] (ISO)  
7/16" - 20 UNF Drain port, thread depth 11 mm [0.42 in] (SAE)
- ③ Main ports

\* For shafts dimensions see page **F24**

\* For main ports dimensions see page **F26**

\* For brake feature see page **F18**

| Main Ports type "M09" - Main Ports type "S09"             |                 |                 |                 |                 |                 |                 |                 |                  |
|-----------------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|
| Displ.<br>cm <sup>3</sup> /giro<br>[in <sup>3</sup> /rev] | 080<br>[4.8]    | 100<br>[6.1]    | 130<br>[7.9]    | 160<br>[9.7]    | 200<br>[12.2]   | 250<br>[15.2]   | 315<br>[19.2]   | 400<br>[24.4]    |
| A<br>mm [in]                                              | 207.2<br>[8.15] | 210.6<br>[8.29] | 215<br>[8.46]   | 221<br>[8.70]   | 228<br>[8.97]   | 236.7<br>[9.31] | 248<br>[9.76]   | 261.6<br>[10.29] |
| B<br>mm [in]                                              | 167.7<br>[6.60] | 171.1<br>[6.73] | 175.5<br>[6.90] | 181.5<br>[7.14] | 188.5<br>[7.42] | 197.2<br>[7.76] | 208.5<br>[8.20] | 222.1<br>[8.74]  |
| C<br>mm [in]                                              | 14<br>[0.551]   | 17.4<br>[0.68]  | 21.8<br>[0.85]  | 27.8<br>[1.09]  | 34.8<br>[1.37]  | 43.5<br>[1.71]  | 54.8<br>[2.15]  | 68.4<br>[2.69]   |
| Weight<br>kg [lb]                                         | 17.7<br>[39]    | 17.9<br>[39.4]  | 18.3<br>[40.3]  | 18.6<br>[40.9]  | 19<br>[41.8]    | 19.7<br>[43.4]  | 20.4<br>[44.9]  | 21.2<br>[46.7]   |

| Main Ports type "L09" - Main Ports type "F09" - Main Ports type "R09" |                 |                 |                 |                 |                 |                 |                 |                  |
|-----------------------------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|
| Displ.<br>cm <sup>3</sup> /giro<br>[in <sup>3</sup> /rev]             | 080<br>[4.8]    | 100<br>[6.1]    | 130<br>[7.9]    | 160<br>[9.7]    | 200<br>[12.2]   | 250<br>[15.2]   | 315<br>[19.2]   | 400<br>[24.4]    |
| A<br>mm [in]                                                          | 218.2<br>[8.59] | 221.6<br>[8.72] | 226<br>[8.89]   | 232<br>[9.13]   | 239<br>[9.40]   | 247.7<br>[9.75] | 259<br>[10.19]  | 272.6<br>[10.73] |
| B<br>mm [in]                                                          | 173.7<br>[6.83] | 177.1<br>[6.97] | 181.5<br>[7.14] | 187.5<br>[7.38] | 194.5<br>[7.65] | 203.2<br>[8.00] | 214.5<br>[8.44] | 228.1<br>[8.98]  |
| C<br>mm [in]                                                          | 14<br>[0.551]   | 17.4<br>[0.68]  | 21.8<br>[0.85]  | 27.8<br>[1.09]  | 34.8<br>[1.37]  | 43.5<br>[1.71]  | 54.8<br>[2.15]  | 68.4<br>[2.69]   |
| Weight<br>kg [lb]                                                     | 17.7<br>[39]    | 17.9<br>[39.4]  | 18.3<br>[40.3]  | 18.6<br>[40.9]  | 19<br>[41.8]    | 19.7<br>[43.4]  | 20.4<br>[44.9]  | 21.2<br>[46.7]   |

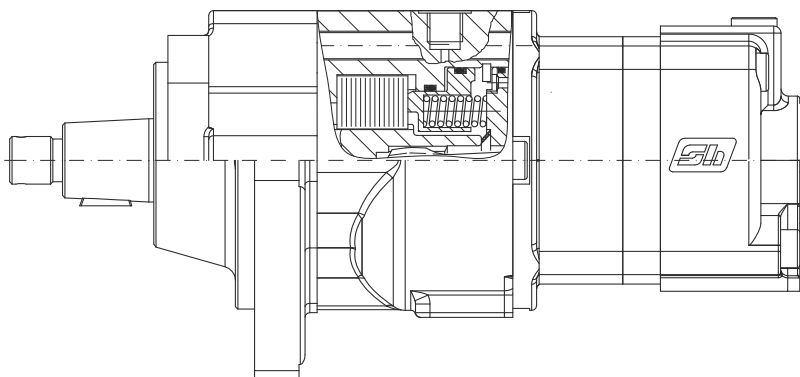
| SHAFT        | CL320         | CN320         |
|--------------|---------------|---------------|
| E<br>mm [in] | 101<br>[3.97] | 102<br>[4.01] |

Click **i** button to return to main index

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## F Version - L Version



| Starting release pressure   | 25 bar<br>[362 psi]      |                          |                          |                          |
|-----------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Full release pressure       | 30 bar<br>[435 psi]      |                          |                          |                          |
| Brake control pressure Max. | 210 bar<br>[3045 psi]    |                          |                          |                          |
| MOTOR                       | STATIC BRAKING TORQUE    |                          |                          |                          |
|                             | STANDARD                 | 12 Springs / 10 Contacts | 8 Springs                | Increased Braking Torque |
| F Version - L Version 080   | 210 Nm<br>[154.7 lbf-ft] |                          |                          |                          |
| F Version - L Version 100   | 280 Nm<br>[206.3 lbf-ft] | 259 Nm<br>[190.8 lbf-ft] |                          |                          |
| F Version - L Version 130   | 340 Nm<br>[250.5 lbf-ft] |                          |                          |                          |
| F Version - L Version 160   | 340 Nm<br>[250.5 lbf-ft] |                          |                          |                          |
| F Version - L Version 200   | 420 Nm<br>[309.5 lbf-ft] |                          |                          | 560 Nm<br>[412.7 lbf-ft] |
| F Version - L Version 250   | 470 Nm<br>[346.3 lbf-ft] |                          | 313 Nm<br>[230.6 lbf-ft] | 560 Nm<br>[412.7 lbf-ft] |
| F Version - L Version 315   | 560 Nm<br>[412.7 lbf-ft] | 259 Nm<br>[190.8 lbf-ft] | 373 Nm<br>[274.9 lbf-ft] |                          |
| F Version - L Version 400   | 560 Nm<br>[412.7 lbf-ft] |                          | 373 Nm<br>[274.9 lbf-ft] |                          |

The brakes built into F version and L version motors are multidisc pressure released ones for static operation. With no pressure from the pump to the motor, a set of springs will push the discs one against the other, hence the motor shaft will not be allowed to rotate unless the shaft itself is driven with a torque widely exceeding the max. static torque of the brake.

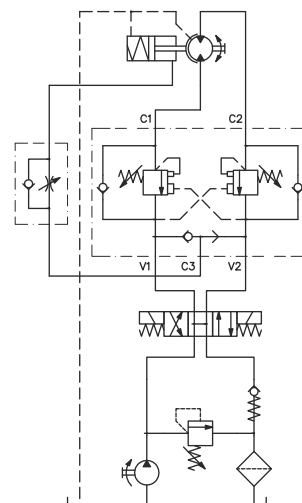
By sending pressure to the motor a shuttle valve (to be included in the system) will send pressure to the brake, overcome the resistance of the springs and release the brake hence allowing the start of the motor. Wheel motors require some care in the engineering of the machine. The major aspects to consider are:

- Hub and motor shaft tapers must be perfectly matching, in order to avoid excessive key stress, which can occur in case of bottoming of shaft tip washer and nut at the end of the thread.
- A proper service factor should be considered in case of shocks to the shaft (eg. With the machine travelling on very uneven soil).
- L version brake motors operating mobile machines should always have a flanged on double overcentre + shuttle valve, in order to ensure safe slow-down of the machine and engaging of brake when a complete stop has been reached.

## OPEN LOOP SYSTEM, ONE BRAKE-MOTOR, BI-DIRECTIONAL TURNING AND AUTOMATIC BRAKE OPERATION.

This configuration is typically that of a slew drive (cranes, excavators, aerial platforms, derricks, etc.).

When the pump delivers oil to the motor the consequent generation of pressure will operate the shuttle valve and activate the brake line, thus disengaging the brake itself. When the oil delivery is shut off to stop the machine, a double overcentre valve will slow down the rotative mass to an almost complete stop when the static brake will engage.

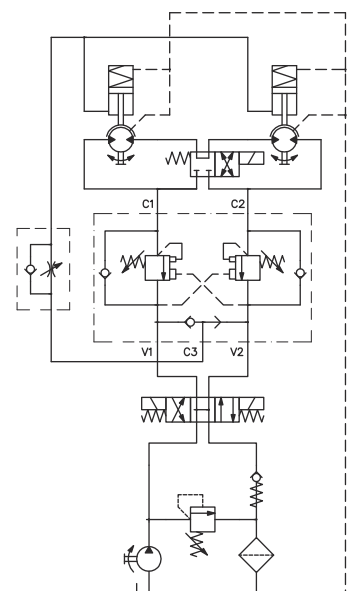


## OPEN LOOP SYSTEM, TWO BRAKE-MOTORS, BI-DIRECTIONAL TURNING AND AUTOMATIC BRAKES OPERATION.

This is a typical layout of the travelling system of a mobile machine (aerial platforms, etc.).

Fluid under pressure disengages the brakes and starts the two motors; a commutation device will connect the two motors either in series or parallel mode in order to have either speed or torque as main performance.

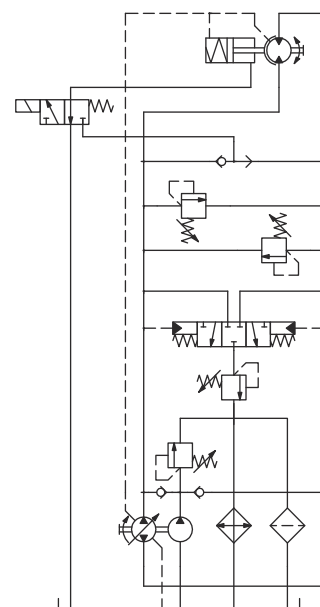
The double overcentre valve will steadily slow down the machine and bring it to an almost complete stop when the brakes will engage.



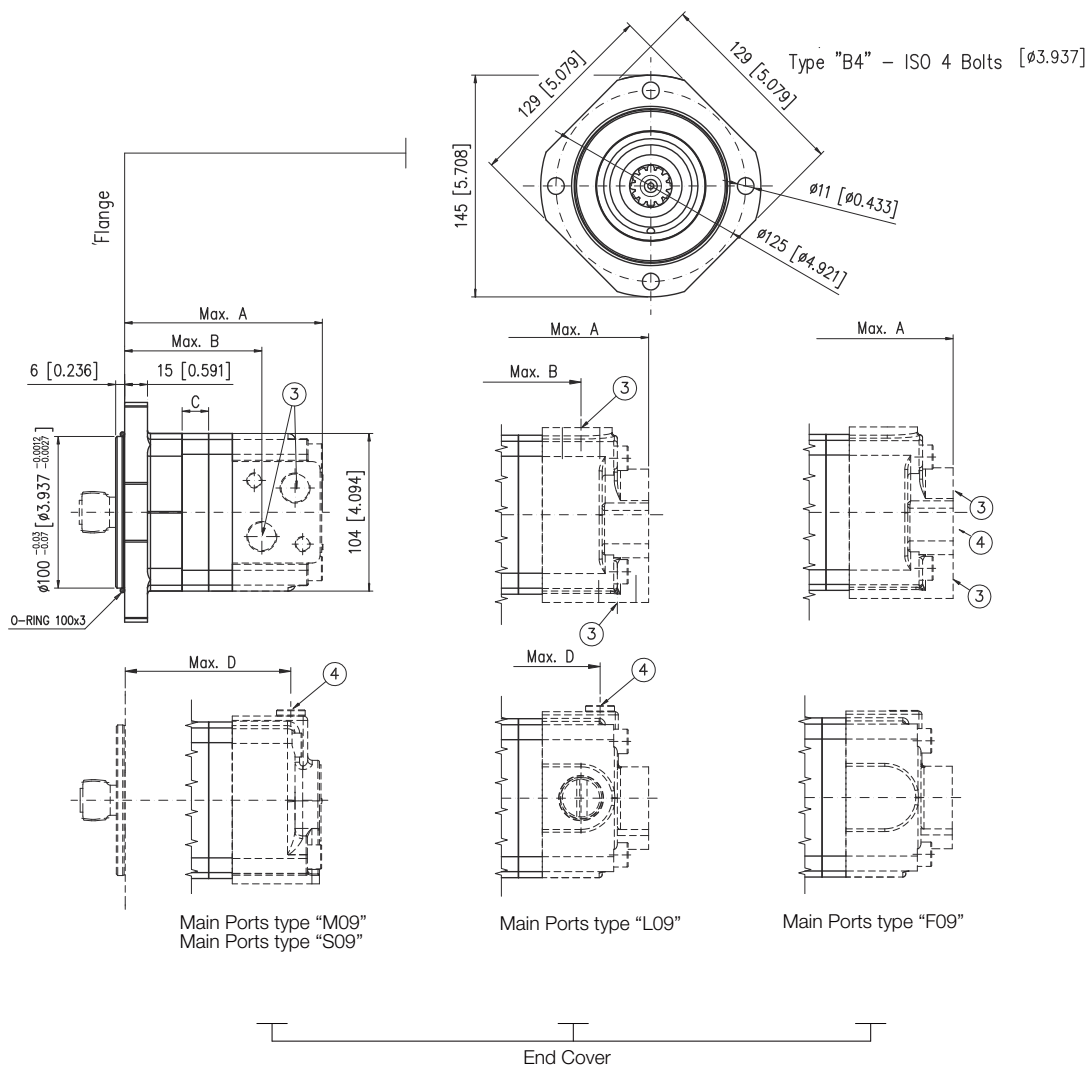
## CLOSED LOOP SYSTEM, ONE BRAKEMOTOR, BI-DIRECTIONAL TURNING, AUTOMATIC BRAKE OPERATION AND VARIABLE PUMP.

A very typical system for sweepers. The pump delivers a variable flow of oil to the motor hence the machine can travel at variable speed.

The brake is disengaged by the delivery of flow from the shuttle valve via the electro-valve (top, right) that will also release the fluid under pressure from inside the brake piston chamber when the motor stops and the brake engages.



## HR C B4 M09/S09/L09/F09



- ③ Main ports
- ④ Drain port

\* For main ports dimensions see page [F26](#)

\* For interface drawing see page [F21](#)

| Main Ports type "M09" - Main Ports type "S09" |                 |                |                 |                 |                 |                 |                 |                 |
|-----------------------------------------------|-----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Displ.<br>cm³/giro<br>[in³/rev]               | 080<br>[4.8]    | 100<br>[6.1]   | 130<br>[7.9]    | 160<br>[9.7]    | 200<br>[12.2]   | 250<br>[15.2]   | 315<br>[19.2]   | 400<br>[24.4]   |
| <b>A</b><br>mm [in]                           | 127.7<br>[5.02] | 131<br>[5.15]  | 135.5<br>[5.33] | 141.5<br>[5.57] | 148.5<br>[5.84] | 157.2<br>[6.18] | 168.5<br>[6.63] | 182<br>[7.16]   |
| <b>B</b><br>mm [in]                           | 87.2<br>[3.43]  | 90.6<br>[3.56] | 95<br>[3.74]    | 101<br>[3.97]   | 108<br>[4.25]   | 116.7<br>[4.59] | 128<br>[5.03]   | 141.6<br>[5.57] |
| <b>C</b><br>mm [in]                           | 14<br>[0.551]   | 17.4<br>[0.68] | 21.8<br>[0.85]  | 27.8<br>[1.09]  | 34.8<br>[1.37]  | 43.5<br>[1.71]  | 54.8<br>[2.15]  | 68.4<br>[2.69]  |
| <b>D</b><br>mm [in]                           | 106.7<br>[4.20] | 110<br>[4.33]  | 114.5<br>[4.50] | 120.5<br>[4.74] | 127.5<br>[5.01] | 136.2<br>[5.36] | 147.5<br>[5.80] | 161<br>[6.33]   |
| <b>Weight</b><br>kg [lb]                      | 8<br>[17.6]     | 8.2<br>[18]    | 8.6<br>[18.9]   | 8.9<br>[19.6]   | 9.3<br>[20.4]   | 10<br>[22]      | 10.7<br>[23.5]  | 11.5<br>[25.3]  |

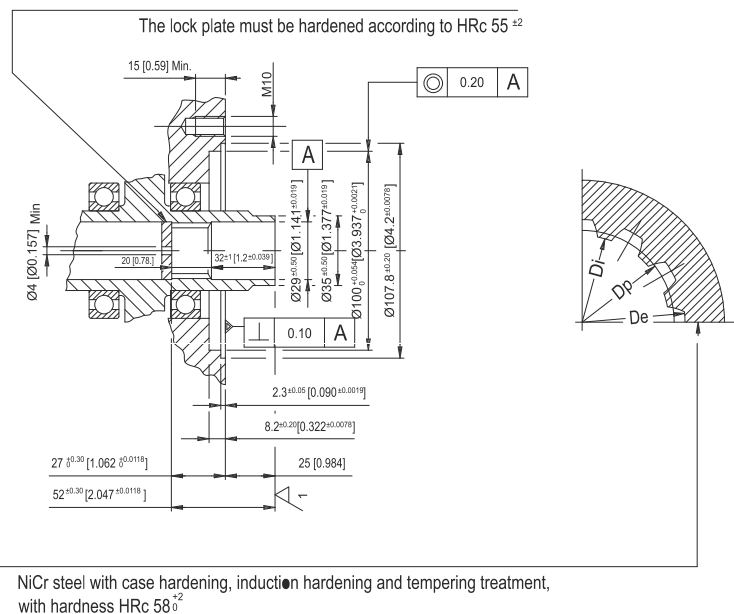
| Main Ports type "L09" - Main Ports type "F09" - Main Ports type "R09" |                 |                 |                 |                 |                 |                 |                 |                 |
|-----------------------------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Displ.<br>cm³/giro<br>[in³/rev]                                       | 080<br>[4.8]    | 100<br>[6.1]    | 130<br>[7.9]    | 160<br>[9.7]    | 200<br>[12.2]   | 250<br>[15.2]   | 315<br>[19.2]   | 400<br>[24.4]   |
| <b>A</b><br>mm [in]                                                   | 140.7<br>[5.53] | 144<br>[5.66]   | 149.5<br>[5.88] | 154.5<br>[6.08] | 161.5<br>[6.35] | 170.2<br>[6.70] | 181.5<br>[7.14] | 195<br>[7.67]   |
| <b>B</b><br>mm [in]                                                   | 93.2<br>[3.66]  | 96.6<br>[3.80]  | 101<br>[3.97]   | 107<br>[4.21]   | 114<br>[4.48]   | 122.7<br>[4.83] | 134<br>[5.27]   | 147.6<br>[5.81] |
| <b>C</b><br>mm [in]                                                   | 14<br>[0.551]   | 17.4<br>[0.68]  | 21.8<br>[0.85]  | 27.8<br>[1.09]  | 34.8<br>[1.37]  | 43.5<br>[1.71]  | 54.8<br>[2.15]  | 68.4<br>[2.69]  |
| <b>D</b><br>mm [in]                                                   | 104.2<br>[4.10] | 107.5<br>[4.23] | 112<br>[4.40]   | 118<br>[4.64]   | 125<br>[4.92]   | 133.7<br>[5.26] | 145<br>[5.70]   | 158.5<br>[6.24] |
| <b>Weight</b><br>kg [lb]                                              | 8<br>[17.6]     | 8.2<br>[18]     | 8.6<br>[18.9]   | 8.9<br>[19.6]   | 9.3<br>[20.4]   | 10<br>[22]      | 10.7<br>[23.5]  | 11.5<br>[25.3]  |

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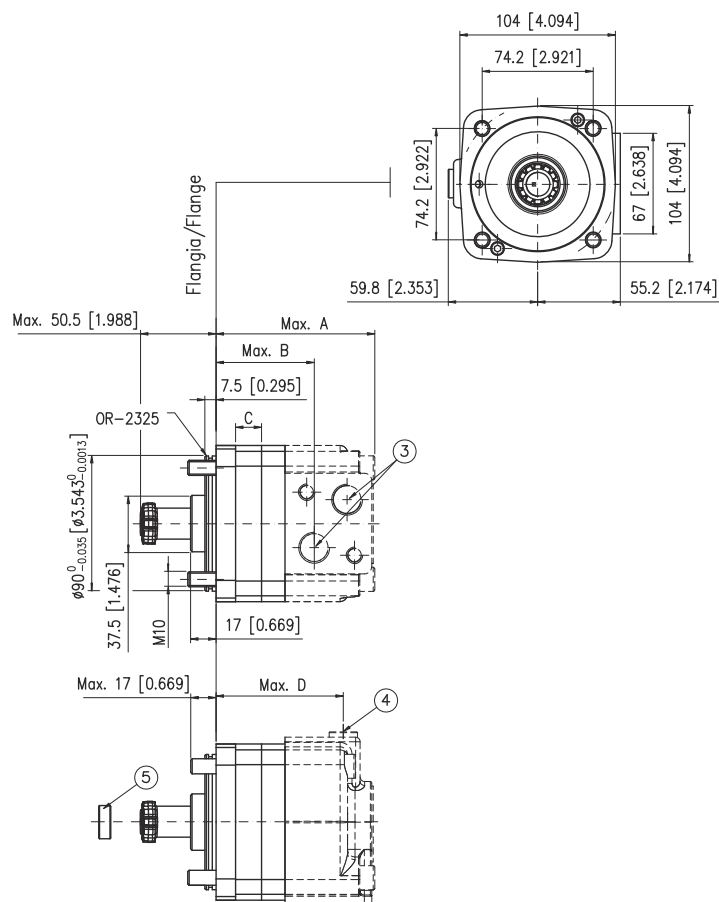
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## INTERFACE DRAWING FOR HR MOTOR "C" VERSION

| Spline ANS B 92.1 + 1970 Class 5<br>(corrected $m \cdot x = 0.8$ ) |                                        |
|--------------------------------------------------------------------|----------------------------------------|
| Diametral pitch                                                    | 12/24                                  |
| Number of teeth                                                    | Z=12                                   |
| Pitch diameter                                                     | Dp=25.4                                |
| Pressure angle                                                     | 30°                                    |
| Module                                                             | m=2.1166                               |
| Minor diameter                                                     | Di=23.0 <sup>+0.033</sup> <sub>0</sub> |
| Major diameter                                                     | De=28.0 <sub>-0.1</sub>                |
| Max measurement between pins*                                      | 17.62 <sup>+0.15</sup> <sub>0</sub>    |
| Pins diameter                                                      | 4.835 <sup>±0.001</sup>                |
| * Finished dimensions (when hardened)                              |                                        |



## HR M M4 M09



Main Ports type "M09"

End Cover

- ③ Main ports
- ④ Drain port
- ⑤ The motors are supplied with spacer

\* For interface drawing see page



Main Ports type "M09"

| Displ. (cm <sup>3</sup> /giro)<br>[in <sup>3</sup> /rev] | 080<br>[4.8]    | 100<br>[6.1]   | 130<br>[7.9]    | 160<br>[9.7]    | 200<br>[12.2]   | 250<br>[15.2]   | 315<br>[19.2]   | 400<br>[24.4]   |
|----------------------------------------------------------|-----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| A mm<br>[in]                                             | 102.6<br>[4.03] | 106<br>[4.17]  | 110.4<br>[4.34] | 116.4<br>[4.58] | 123.4<br>[4.85] | 132.1<br>[5.20] | 143.4<br>[5.64] | 157<br>[6.18]   |
| B mm<br>[in]                                             | 62.2<br>[2.44]  | 65.6<br>[2.58] | 70<br>[2.75]    | 76<br>[2.99]    | 83<br>[3.26]    | 91.7<br>[3.61]  | 103<br>[4.05]   | 116.6<br>[4.59] |
| C mm<br>[in]                                             | 14<br>[0.551]   | 17.4<br>[0.68] | 21.8<br>[0.85]  | 27.8<br>[1.09]  | 34.8<br>[1.37]  | 43.5<br>[1.71]  | 54.8<br>[2.15]  | 68.4<br>[2.69]  |
| D mm<br>[in]                                             | 81.6<br>[3.21]  | 85<br>[3.34]   | 89.4<br>[3.51]  | 95.4<br>[3.75]  | 102.4<br>[4.03] | 111.1<br>[4.37] | 122.4<br>[4.81] | 136<br>[5.35]   |
| Weight kg<br>(lb)                                        | 6.5<br>[14.3]   | 6.7<br>[14.7]  | 7.1<br>[15.6]   | 7.5<br>[16.5]   | 8<br>[17.6]     | 8.6<br>[18.9]   | 9.4<br>[20.7]   | 10.3<br>[22.7]  |

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The lock plate must be hardened according to HRC 55<sup>±2</sup>

Technical drawing of a lock plate (Fig. 1) showing dimensions and material specifications. The drawing includes a side view and a cross-sectional view.

**Material and Heat Treatment:** NiCr steel with case hardening, induction hardening and tempering treatment, with hardness HRC 58<sup>±2</sup>.

**Dimensions (mm):**

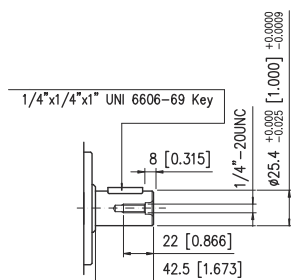
- Overall width: 104 [Ø4.094]
- Overall height: 104 [Ø4.094]
- Top hole diameter: Ø37 [Ø1.456] Min.
- Top hole position: 0.10 A
- Top hole depth: 0.030 [0.00118]
- Top hole offset: 0.5 [0.019]
- Top hole diameter: Ø90 [Ø3.543 ±0.0018]
- Top hole offset: 0.60 [Ø2.362]
- Top hole diameter: Ø4 [Ø0.157] Min.
- Top hole offset: Ø40 [Ø1.574] Min.
- Top hole diameter: 28 [1.102]
- Top hole offset: 59.5 ±0.30 [2.342 ±0.0118]
- Top hole diameter: 22 [Ø0.866] Min.
- Top hole offset: 7.5 ±0.2 [0.295 ±0.0078]
- Top hole offset: 1.6
- Top hole diameter: 0.20 A

**Geometric Features:**

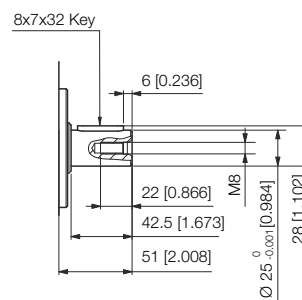
- Top hole: Ø37 [Ø1.456] Min.
- Top hole: Ø90 [Ø3.543 ±0.0018]
- Top hole: Ø4 [Ø0.157] Min.
- Top hole: Ø40 [Ø1.574] Min.
- Top hole: 28 [1.102]
- Top hole: 59.5 ±0.30 [2.342 ±0.0118]
- Top hole: 22 [Ø0.866] Min.
- Top hole: 7.5 ±0.2 [0.295 ±0.0078]
- Top hole: 1.6
- Top hole: 0.20 A

**Notes:**

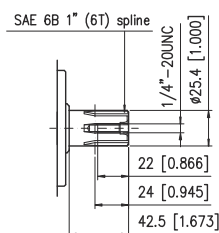
- Top hole: 0.10 A
- Top hole: 0.030 [0.00118]
- Top hole: 0.5 [0.019]
- Top hole: 0.60 [Ø2.362]
- Top hole: Ø4 [Ø0.157] Min.
- Top hole: Ø40 [Ø1.574] Min.
- Top hole: 28 [1.102]
- Top hole: 59.5 ±0.30 [2.342 ±0.0118]
- Top hole: 22 [Ø0.866] Min.
- Top hole: 7.5 ±0.2 [0.295 ±0.0078]
- Top hole: 1.6
- Top hole: 0.20 A

**CL254 Cylindrical Shaft**

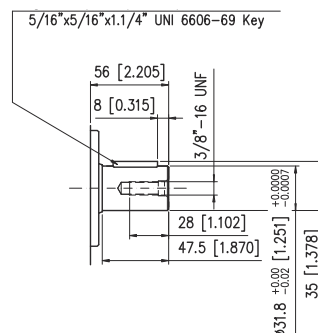
Max. admissible Torque  
(Cont. 300 Nm [221 lbf-ft] - Int. 410 Nm [302 lbf-ft])

**CL025 Cylindrical Shaft**

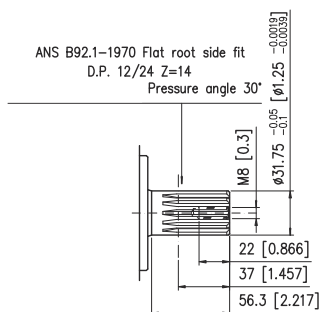
Max. admissible Torque  
(Cont. 300 Nm [221 lbf-ft] - Int. 410 Nm [302 lbf-ft])

**SE250 Splined Shaft**

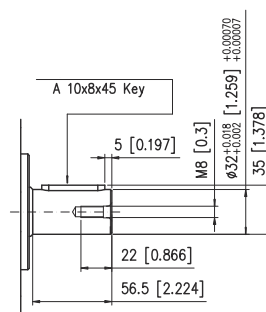
Max. admissible Torque  
(Cont. 360 Nm [265 lbf-ft] - Int. 450 Nm [332 lbf-ft])

**C3175 Cylindrical Shaft**

Max. admissible Torque  
(Cont. 768 Nm [566 lbf-ft])

**SC320 Splined Shaft**

Max. admissible Torque  
(Cont. 768 Nm [566 lbf-ft])

**CL320 Cylindrical Shaft**

Max. admissible Torque  
(Cont. 768 Nm [566 lbf-ft])

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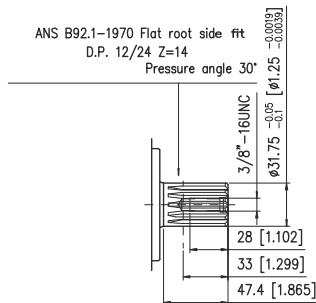
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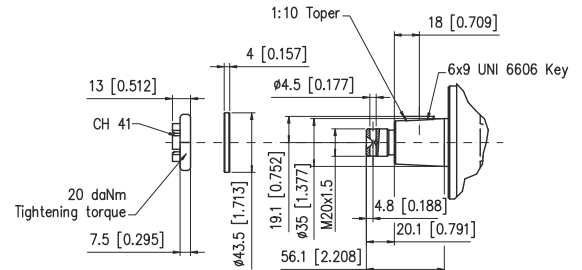
13

## SE320 Splined Shaft



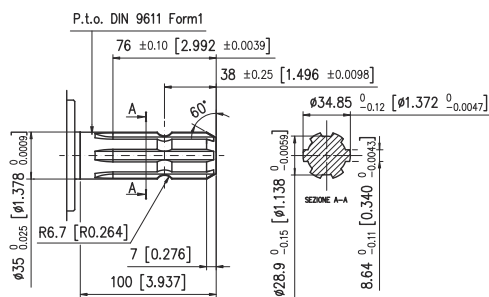
Max. admissible Torque  
(Cont. 768 Nm [566 lbf-ft])

## CN320 Tapered Shaft



Max. admissible Torque  
(Cont. 860 Nm [633.82 lbf-ft])

## SE350 Splined Shaft

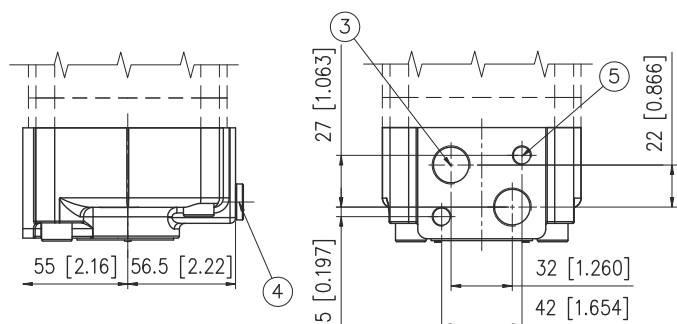


Max. admissible Torque  
(Cont. 860 Nm [633.82 lbf-ft])

## Main ports dimensions and direction of rotation

|   |   |   |   |   |   |   |   |   |    |    |    |    |
|---|---|---|---|---|---|---|---|---|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|

### M09 1/2 G BSPP (32x22)



- ③ N° 2 Bolts 1/2 G (BSPP) main ports thread depth 15 mm [0.59 in]
- ④ 1/4 G (BSPP) drain port thread depth 13 mm [0.511 in]
- ⑤ N° 2 M10 thread depth 15 mm [0.59 in]

S Version

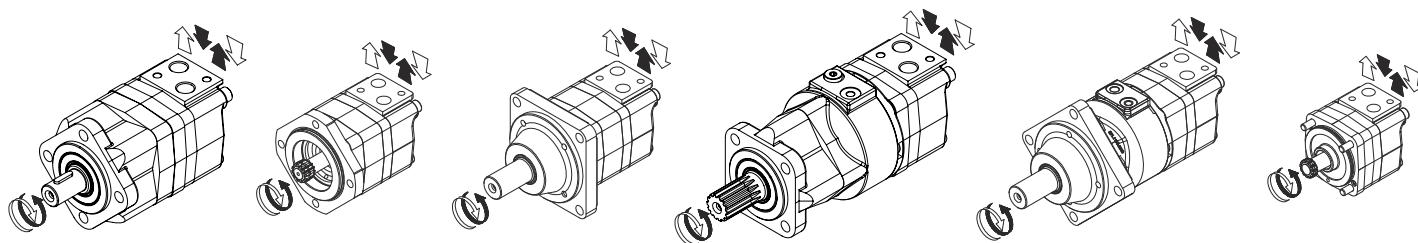
C Version

W Version

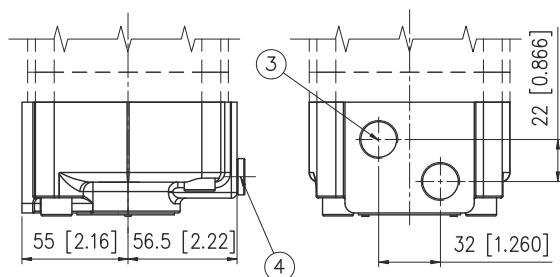
F Version

L Version

M Version



### S09 7/8" - 14 UNF (32x22)



- ③ N° 2 Bolts 7/8" - 14 UNF main ports thread depth 17 mm [0.66 in]
- ④ 7/16" - 20 UNF drain port thread depth 13 mm [0.511 in]

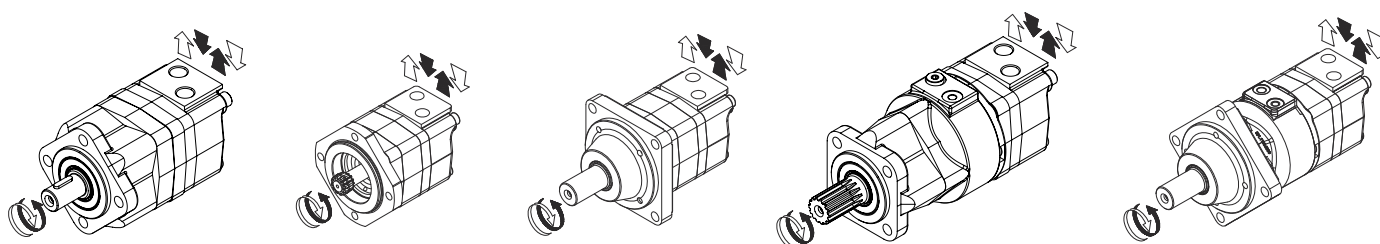
S Version

C Version

W Version

F Version

L Version



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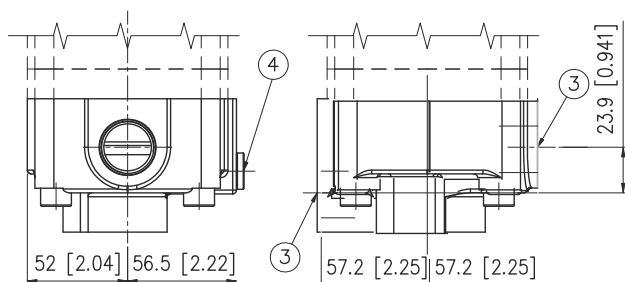
10

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13

## L09 1" 1/16 - 12 UN (Main Ports Positioned 180° apart)



- ③ N° 2 Bolts 1" 1/16 - 12 UN main ports thread depth 20 mm [0.78 in]
- ④ 7/16" - 20 UNF drain port thread depth 13 mm [0.511 in]

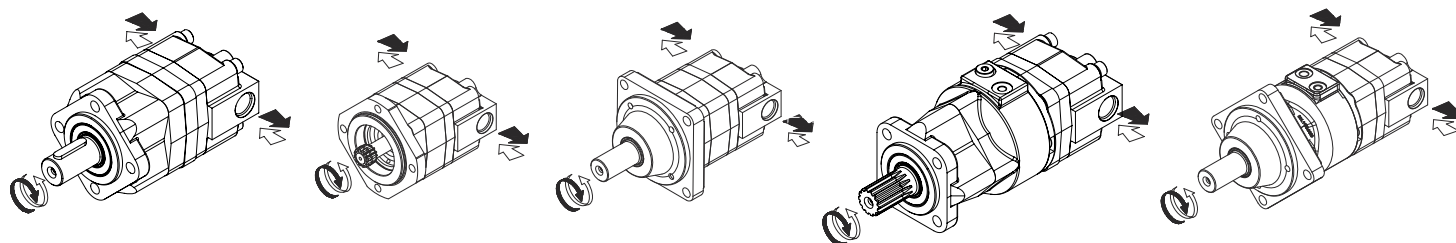
S Version

C Version

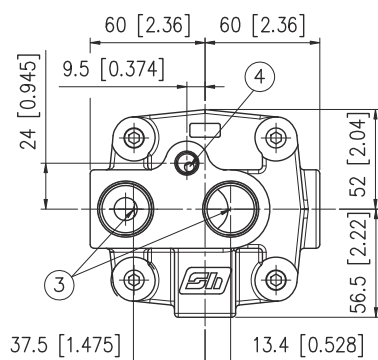
W Version

F Version

L Version



## S09 1" 1/16 - 12 UN (End Main Ports)



- ③ N° 2 Bolts 1" 1/16 - 12 UN main ports thread depth 17 mm [0.66 in]
- ④ 7/16" - 20 UNF drain port thread depth 13 mm [0.511 in]

S Version

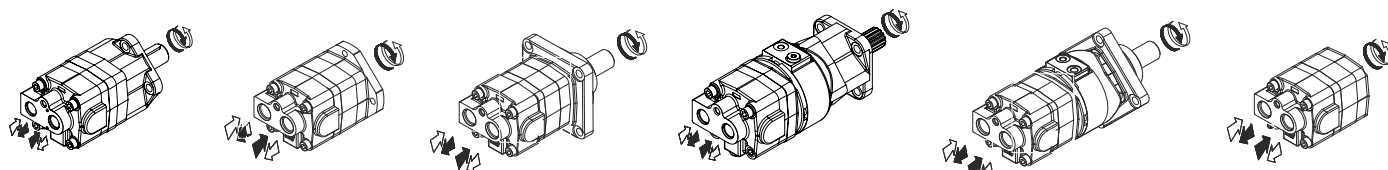
C Version

W Version

F Version

L Version

M Version



Click **i** button to return to main index

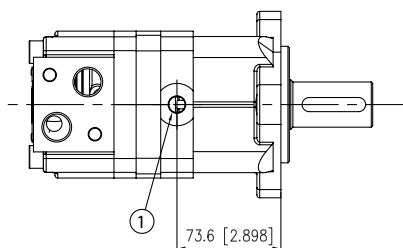
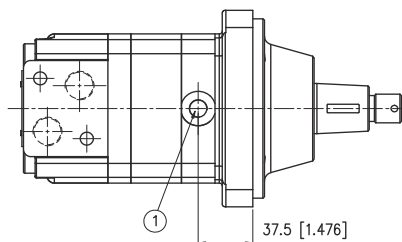
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## SECONDARY DRAIN PORT (AT DELIVERY SIDE)

For the motor with S-W version, it is possible to put a secondary drain port (at delivery side).

If it is necessary on the motor a secondary drain port, to specify in the purchase order the value "OKK" for metric version or "SKK" for SAE version (See position 12 of ordering code)

**S Version****W Version**

- ① 1/4 G (BSPP) drain port (OK)  
7/16" - 20 UNF drain port (SK)

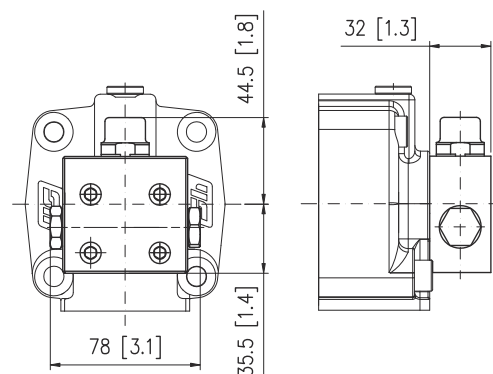
## LOW LEAKAGE

For applications with low flow and high working pressure, it is recommended the Low Leakage version. The Low Leakage version differs from the standard version for the different internal components.

## SPECIAL COVER FOR FLUSHING VALVE

To mount the flushing valve on motors, it is necessary to use a special cover. This is only possible with the "M09 - S09" main ports.

If it is necessary to assemble the flushing valve on motors, to specify in the purchase order the valves type 06-09-15-21 (See position 10 of ordering code)



For more informations on the Flushing valve, see the Valves and Accessories section or Service Bulletin - 05-0082-A04

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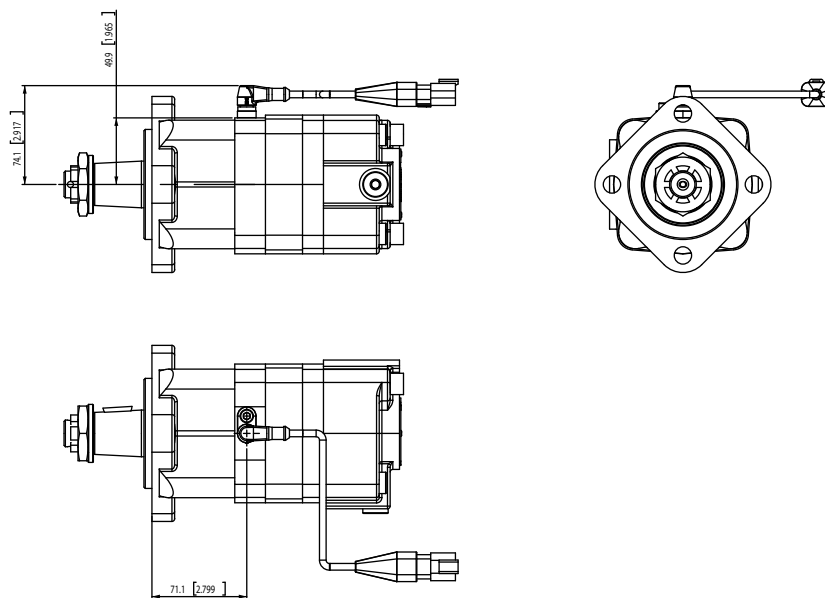
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**TZ****Tachometer + sensor 2-channel-Hall effect (55 pulse)****Main features:**

2-channel differential-hall effect operating principle sensor

Output: dual-channel ( 90°)

Power supply: 8-32 VDC

Frequency : 0-20000 Hz

Operating temperature: -40°C / +125°C

Number of pulses per revolution: 55